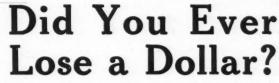
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Volume XXXVII Number 26

PUBLISHED WEEKLY AT THE MALLERS BUILDING CHICAGO, JUNE 24, 1920

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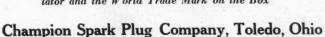
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Vol. XXXVII

June 24, 1920

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The Accessory Show Case.
Service Equipment
Law in Your Business.
The Automotive Repairs Shop.
Weekly Wiring Chart.
Spark Plug Data Sheet.
Tractor Specifications Table.
From the Four Winds

#### MOTOR AGE

MALLERS BUILDING CHICAGO

Phone Randolph 6960 Cable Address "Motage"

CHICAGO

E. E. HAIGHT, Manager

DAVID BEECROFT, Directing Editor

RAY W. SHERMAN, Executive Editor

B. M. IKERT, Editor

DETROIT, 95 Fort St., W., Phone Maine 1351
CLEVELAND, 536-540 Guardian Bldg., Main 6432
NEW YORK CITY, U. P. C. Bldg., 239 W. 39th St.

Phone Bryant 8760 PHILADELPHIA, Widener Bldg., Phone Locust 342-343

4	- SUBSCRIPTION RATES
	United States, Mexico and U. S. Possessions 5.00 per year
	Canada
	Single Copies

Entered as second-class matter, September 19, 1899, at the Post Office, Chicago, Illinois, under Act of March 3, 1879.

Owned by UNITED PUBLISHERS CORPORATION, 239 W. 39th St., New York, H. W. Swelland, Pres.; Charles S. Phillips, Vice-Pres.; W. H. Taylor, Treas.; A. C. Pearson, Sec.



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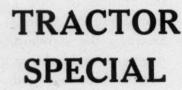
Ball. Roller, Thrust and Combination Bearings

# ALL DAY LONG IN LOW GEAR

If you were to run your car all day long at its maximum speed in low gear, what would happen to your motor and to the accessory units that comprise its equipment? Is your motor built, or are its units built to withstand a continuous gruelling of this sort?

#### YET YOU, MR. DEALER

are selling ordinary spark plugs a stractor equipment, where conditions such as the above are encountered. They are not giving service through no fault of their own, but because they were not built to withstand such abuse. You wouldn't attempt to pull a plow with a passenger car, and you can't pull a tractor with a passenger car plug.



spark plugs must be specially designed and specially built. The Hel-FI line offers a special model which was designed and built, tested and proven for and in tractor service. The manufacturers have sought out extreme cases where motors were particularly vicious or were subjected

to unusually long and hard grinds, and without exception, HEL-FI plugs have gone into these motors and eliminated fouling, compression leakage, preignition and all of the other difficulties ordinarily

encountered.

#### YOU OWE IT

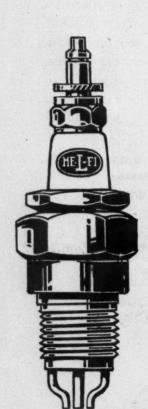
to yourself and to your customers to investigate and stock this line of spark plugs.

For full particulars write your jobber or The HEL-FI COM-PANY, Belvidere, Illinois.

Send for booklet "Why Hel-fi"







# MOTORAGE

# WONDERFUL TIMES AHEAD

## Good Judgment and Common Sense All That Is Necessary

In VIEW of some of the alarming predictions which have been made recently as to just what will happen in this country, it is interesting to know that some of our industrial and engineering authorities do not agree with them. They take the opposite view, and their viewpoint is certainly refreshing and encouraging to say the least.

After the signing of the armistice, three plagues put in their appearance. These three might be termed "spenditis," "speculatitis" and "profititis." The last named had already had a fair start before the war was ended. These three plagues are the cause of the present situation.

Take the first, "spenditis." Everywhere, money is being spent wastefully and in many cases foolishly. People generally have purchased goods of all kinds in line with a policy of, "We want what we want when we want it and price is no object." Money which should have been used to pay off obligations contracted during the war, has been carelessly spent.

#### Speculation Running Riot

"Speculatitis" is prevalent everywhere. You cannot pick up a newspaper unless you find half a dozen or more new stock issues advertised. If that isn't the case, paper is being conserved or the printers are on a strike. People who never speculated before, have been carried away by the lure of big profits and easy money. Many issues of a very questionable character have been sold to people who could not afford to take a chance.

"Profititis" seems to be a very contagious malady. It seems that almost every producer, manufacturer and distributor has the fever. They are trying to see how much money they can get for their goods without a fight. Prices in many instances are not made on a basis of the cost of the goods, but on the basis of, "How much can we get for them?" which is absolutely unfair.

Another disease has appeared which we might term "strikitis." It is as bad

as any of the other three and has behind it some of the elements of these. It has curtailed production, the thing most needed in order to get back to a normal basis. In many cases it has fostered the idea that a day's work should be no



C. F. Kettering, chief engineer of the General Motors Corp., whose optimistic views are set forth in this article

more than from six to eight hours of doing the least to hold the job.

These things have brought on some big problems. One of the biggest problems is the high cost of living. Prices are abnormally high. History tells us that after each war prices of all commodities have increased and been maintained for a period of years. It took about eight years to return prices to near normal, after the Civil War.

The destruction of material during the great World War has been so great that it will take a much longer period for their return, if indeed, we shall ever see them on a pre-war basis. The economic causes for these inflated prices are traceable to the enormous waste and destruction during the war; the lack of production, caused largely by the taking of man power from its accustomed labor, and the great unrest among producing classes.

The popular demand for fewer hours and very greatly increased pay is one of the great economic causes for our high prices. Every man should receive just compensation for his labor, but the world to-day is becoming so densely populated and is naturally consuming such a vastly increased amount of supplies that the shorter hours of labor are not producing enough to meet our needs.

#### Help Leaving the Farm

The great drift from the agricultural districts to manufacturing centers, because of the lure of larger pay, shorter hours and the attractions afforded in the city have caused the production of foodstuffs to be very greatly curtailed. This reverses the ratio of consumers to producers and that tendency is growing more and more every day.

Some of our financial centers have become thoroughly alarmed at the apparent chaotic condition of things. Retrenching on all sides and in all things has been urged and advised. Panics, national and international crises have been freely prophesied as being imminent within the next few months. Recently, C. F. Kettering, one of the vice-presidents of the General Motors Corp., and chief engineer of that organization, gave his views on existing conditions.

Mr. Kettering is in charge of all the research and development work of the General Motors Corp. He is known nationally and internationally for his invention of the Delco starting, lighting and ignition system; the Delco light electric farm lighting plant; his work in assisting to bring out the Liberty engine, and many other valuable inventions that have contributed to human welfare. He is recognized as one of the foremost automotive engineers and electrical experts. His opinion doubtless reflects that of many other industrial leaders and engineers and is, therefore, of interest to all.

Mr. Kettering is very optimistic. He says, "Now is the time when we have to do a little real fundamental analysis Those of us who are not particularly interested in finance are realing very hopeful. We are certain that there are wonderful times ahead. This matter of the markets going up or down does not interest us very much. We know there is a lot of "wild-catting" going on. It is up to the bankers to stop that. They must be the constabulary of the world. But so far as the great legitimate enterprises of the world are concerned, we are looking at them in an altogether different light.

"There is a great deal of uncertainty among the people as to how long the present prosperous conditions will last. We need only to analyze a few conditions to become convinced that times will not change within the next five years, at the least. If they do not change in that time, the chances are they will not change at all.

#### War Exhausted World's Supplies

"During the war, the world got far behind in products necessary for human welfare. Its whole energies were bent upon destruction of the enemy. All the reserve supplies and intelligence of the people were turned over to the one common task of beating the enemy. We came out of the war with the bins of the world entirely exhausted of reserve supplies.

"The demand for manufactured products is at least fifty percent greater than the supply. The requirements for cast iron throughout the United States for the coming year are so great that they cannot be met. This isn't because we cannot get the iron ore, but the supply of coke, used to melt cast iron, is inadequate. Here we find coke as the limiting factor. The steel situation is such that if the steel supply was equal to the demand, it would have to be at least 50 per cent greater than it is. All of this is further aggravated by the fact that our transportation has absolutely broken down. This must be put back into shape. Take the case of steel for instance. If the supply were equal to the demand, it would still have industry handicapped because of our inability to move it.

"The world is demanding from all sources, anything which will supplement human endeavor and make it more effective. We need a great many things in this country. We need first of all, a great supply of labor. We must have basic metals. We must have products of all sorts, and production of all things

is necessarily limited by the production of supplies from which we can work." of raw material.

"The demand is not to be satisfied this year, next year, or for several years to come. In addition to the demands made before the war and during the war, the demand has greatly extended because of some very definite reasons. The cry for labor is so great that any labor-saving device is in demand. The whole world is asking for devices which will conserve labor. The world lost a great many men during the war. Some 9,000,000 were killed in Europe. We lost about 100,000. That is insignificant compared to the loss through the influenza epidemic. Statisticians tell us that about 20,000,000 people died because of this in the fall of 1918 and 1919. With so many lives lost the labor problem becomes serious, and the demand for products is great to-day and will become greater because of the labor shortage."

A short time ago a small banker in a country town was advised by an official of a Federal Reserve Bank to call in his loans as fast as possible and to conserve his resources, and make no additional loans. He was advised to hold his money in reserve. This Federal Reserve banker predicted that the nation would be in the midst of a panic within the next six months.

In speaking of this, Mr. Kettering said, "I disagree with him. I don't care what he knows. With conditions existing as they are to-day, it is impossible to force a panic. The demands for things which contribute to human life and welfare are far greater than the supply and when that condition prevails you cannot force a panic. The time might be extended and a panic forced next year by some very hard work, but I am unable to see any signs of this country being upset this year, or for a good many years to come.

#### Big Demand for Everything

"Take the automobile industry, with which I am pretty familiar. We know of certain manufacturers building automobiles to-day that have all been sold. One manufacturer making a high priced car, with an output of 20,000 cars a year, has his entire output sold and a cash deposit for every car he expects to produce. With farm tractors the same condition prevails. If we were able to build two or three times as many as we are building, we couldn't supply the demand.

"Foreign countries are demanding supplies as never before. We were told last summer that unless the demands could be met, two or three millions of people would starve. We exhausted every reserve supply of every kind the world possesses and still the world is crying for every type of human necessity.

"The demand for everything is so great, we can't handle it. If we had the supplies, we would not be able to move them, because of the transportation. There are factories running to-day which are able to run only because of express shipments received this morning. Tons and tons of raw material are being held up in congested places. There is no base

In speaking of the results of the war, Mr. Kettering expressed a thought which one does not meet very often. "We went ahead twenty years during the five years of the war," he said. "This is due to the inter-communication of manufacturing and scientific information which was formerly so carefully guarded as a trade secret. This was given to all people in the same line of endeavor, in order to further the common cause. We now recognize many things as possible which we refused to consider before the war.

"Out of the war came a lot of good knowledge which has contributed to every industry, no matter what it is. I don't believe a carpet tack is made today just as it was before the war. Now, if we take this information and apply it to our industries, we can pay the money cost of the war in the next twenty-five years, rather than spreading it over for a couple of centuries. Because of this, the war can become a good thing, in that way. We can never repay the cost of the lives lost. But so far as economic conditions are concerned, we can pay the cost and still have a good profit left over.

#### Do Things Thought Impossible

"The trouble was that it took the war to get us out of a rut. People had been in a rut and it was a difficult thing to convince them that they had to do things in a different way. Take, for instance, a company that had been using brass to make a certain part. The government came along and told them that they could not use brass but had to use steel. As soon as this was done, they threw up their hands and said it could not be done. The fact is, they had never tried. Then when they did try, they found that steel was much better than brass and they had been foolish to use brass. That happened in almost every department. The world was drawn out of its ruts. The trouble now is, we don't know which rut to get back into.

"All manufacturers, scientists, and engineers, who had any particular knowledge, dumped it into the great melting pot. Unless you have studied this you will not realize how this entered into the production of war materials. We looked at things differently, analyzed them differently. This has resulted in our doing things differently now, because of the new knowledge we have acquired. We will never go back to the old way. We have stepped forward and in stepping forward have created a dearth in the supply of human utilities. In my opinion this country is comparatively on Easy street.

"We hear a lot about the shortage of homes in the city. That is entirely natural. Industrial demands are drawing people from the country to the city. in New York state, seventeen per cent of the country people have gone to the city. In Ohio, it averages about one per cent, per month. In Indiana, it is fourteen per cent in the last eighteen months. In

(Continued on page 35)

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# Give the Owner a Report of the Work Done

WITH the advent of the motor car came the simultaneous introduction of motor car service, and dissatisfaction has reigned ever since. The chief reason that dissatisfaction has been so prevalent is because the service man has not been able to sell his business. He has been and is thwarted at every turn by the manufacturer who has failed to place in the hands of the owner a serviceable car. These facts we are all aware of, but while these designs are placed in our hands to maintain and keep running we must devise means to attain that end.

One of the big obstacles to overcome is to sell the car owner on the innocence of the service department in connection with the labor charge of the bill. We must not, however, try to put anything over on the car owner under the guise of the inaccessible construction of the car! We must not stoop to perjury for the sake of covering up the defects in our repair department, if it happens that the men are new and not as experienced as they might be. The men must be educated to render efficient, workmanlike service, even though they are forced to

work under conditions extraneously imposed. In other words, the car owner must be educated to understand the problems encountered by the service department. The service department is surely not to blame because a small part in the oil pump must be replaced at charge many times over the cost of the

#### Enlightening the Owner

How is the owner to know the labor involved for replacement of the parts? The illustration shows a simple form entitled "Work Sheet Report," which is given the owner, and this, together with the receipt, shows the amount of work done. This form is made out in duplicate in the Reinhard Brothers Co. establishment. The original is made out by the man doing the work and the copy accompanies the job to the owner. In the case of Reinhard Brothers where a good deal of the work done is electrical, and done for the dealer who ships some particular part in, this copy goes to the dealer who expressed the part. And the dealer makes what disposition of the form he chooses. Very often he gives it to the owner that he may see what was done on the part.

There is no mention of price made on this form. It is merely a work report and as such gives a complete record of every detail accomplished. The form shown in the illustration is made out for electrical work. Every part of a starting motor, generator, magneto, or ignition system is catalogued. Whatever is done is checked. In this way many possibilities for unpleasantness are eliminated, and the dealer who gets this job back from Reinhard Brothers knows exactly what was done and the car owner knows what was done when this slip is passed along to him.

It is very easy to see the wide applicability of this form. For engine work it would prove indispensable. For axle, clutch and transmission work this form would reduce the effort necessary to put the work over satisfactorily.

. What we further need to simplify service systems are serviceable designs. It is here that the whole question of service begins.

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A detailed report of the work performed on each unit is sent with the bill by Reinhard Bros. Co., Minneapolis. This eliminates many of the misunderstandings caused by owners and dealers not knowing what work was done and holding up payment of the bill as a result



This picture was taken on one of the Children's days, which the Jennings Tire Service Co. puts on once a month.

The crowd bespeaks the popularity of the festivities

### MAKING MONEY WITH A TIRE SERVICE CLUB

#### Customers Carry a Membership Card Entitling Them to Free Road Service

YEARS ago the A. H. Jennings & Sons, of Kansas City, learned that the tire business was entirely too important to be considered a side line, as it is by the average garageman who sells tires only as a matter of necessity. Where-

FOR YOUR CONVENIENCE

Jennings Tire Service
... PHONE 273 ...
231 South Main Street
Free Quick Road Service

Open Until 10:00 P. M.

fore, this concern looked at the serious side of the business, which accounts for the fact that to-day it is operating two places in Kansas City and one in Ottawa, Kan.; all three going at top speed and making money.

The Jennings company tries to tie up permanent satisfaction with every article it sells or with every repair job turned out. It feels a sale is not completed until the customer is satisfied.

As a sort of introductory to the branch at Ottawa the company issued twenty-five hundred \$1 checks to each motor car owner in Franklin county. This went out with a letter and sticker, the latter reproduced herewith. This was done only a few weeks ago, and due to the time limit of sixty days on the validity of the check it probably will take

the full limit of the time to make an estimate as to the amount of business it will bring. There has also been organized at various Jennings institutions a Jennings Tire Service Club, the membership card of which is shown on this page.

Left, one of the stickers put on all the letters and other matter sent out by the concern. Rights the card issued to members of the Jennings Tire Service Club, which entitles holder to a certain amount of free service on the road

No.

NOT TRANSFERABLE

MEMORER OF THE

Jennings Tire Service Clvb, Kansas City, Ks.

sentitled to Free Road Service in having tires and tubes changed during the year flow 1st, 1919 to Oct 31st, 1920.

changed during the year flow 1st, 1919 to Oct 31st, 1920.

dence that the holder has a charge account with The Jennings Tire Service Co and is authority for Service Station to Jennings Tire Service Club

Jennings Tire Service Club



E desire to express our hearty appreciation of your patronage during the past year and trust that our service to you has been such as will merit its continuance. May your Christmas be a merry one and may the bright lights of prosperity attend you unfailingly throughout the New Year.

Jennings Tire Service Company

754 Minnesota Avenue, Kansas City, Kansas 231 South Main St. Ottawa, Kansas

At Christmas time, the Jennings company sends out cards similar to the one above

Each member carries one of these cards and a white card filled out by the customer with the necessary data is sent to the concern for its files. This serves as a reference for the protection of the customer and company.

This club eliminates the free service idea, allowing the concern to select customers that actually are giving business justifiable to the rendering of free service of this sort. Customers who are not entitled to the free service card are charged for the changing and application of their tires on the road. This offers the customer who is entitled to protection, the best there is in service and eliminates the drones who are not paying any particular revenue.

There also has been installed a Boys' Club, which entitles each boy to enroll and carry with him a certificate from the Jennings company, stating that he is a member of the club, and for every tube which he brings in for repair he is to receive five cents. For casings the youngsters bring in, they get twenty-This is done immediately five cents. upon receipt of the tube or casing and ceases the responsibility of the boys having to deliver the tubes or casings to the owners. The Jennings company delivers the repaired tires to the customers through the free tire service club, or the owners call at the service station for them.

Once a month the concern has a Children's Day and the illustration at the top of this story is an indication as to the popularity of this idea. Not only the children take an active part, but the parents as well. The children receive little souvenirs in the way of tops, whistles, etc., and the grown-ups gasoline measuring sticks. The results of the children's days are such, that on one occasion the retail sales were more than tripled over any other day of that week.

Truck owners of this vicinity especially appreciate the big advantage of having at their disposal the gigantic 250A. C. FASENAIYER, Sr., Prendent 4, H. JENNINGS, Jr., Vice-President The Jennings Tire Service Co. HIGH GRADE TIRES 754 Minnesota Ave. KANSAS CITY. KANSAS Dear Sir:-We intend to make JENNINGS TIRE SERVICE an indispensable element in your business. JENNINGS - A. H. Sr., Harry and Frank and associated with them the Fasenmyers, A. C. Sr. and A. C. Jr.--but then you know them. TIPE - Oldfield, Firestone, Pennsylvania, Michelin-Pneumatics, Solids, Cushions. SERVICE - About which volumes could be written. What does it mean to you? Do you know that we maintain for your benefit the best equipped tire repair shop in Kansas? Do you know that we have there a man who has spent years in the study of the upkeep of tires? Do you know that he will be glad to make thorough inspections of your tires every week or as often as you will go in to see him at 8th & Minnesota? Do you know that you will save money if you will listen to him and care for your tires as he advises? Do you know that it is our policy to do everything in our power to make your tires wear longer? Do you know that we maintain a floet of service cars day and night to serve you when you need them? Do you know that our telephone number on both 'phones is West 1834? The enclosed membership card is for your use. Use it, and if the service is not what you think it should be, tell us about it. Please return the white card for our files.

THE JENNINGS TIRE SERVICE COMPANY

Both Phones West 1834. By HADELL TIMES THE MOST TRUSTWORTHY TIRES BUILT

Facsimile of letter sent out by the Jennings company to acquaint its customers with the sort of service it is specializing in

ton tire press for the application of solid and cushion tires. This one feature alone saves the truck operators of Franklin county vast sums of money by eliminating the loss of time necessary

for the application of solid tires. What it takes to make a complete tire shop, the Jennings company has. It can repair the smallest puncture or press on the largest truck tire.

#### Pass Resolutions for Uniform Battery Service Methods

THE resolutions herewith regarding cell voltages on batteries while charging, and heavy discharge tests on batteries when first brought in, which were adopted by the electrical division of the Automotive association, Cleveland Chamber of Commerce, had for a purpose, first, the determination of what storage battery experience had shown to be reliable battery practice and accepted by the majority of battery service stations, and second, the official adoption of this battery practice as a standard for all service stations, thus tending to eliminate non-uniform methods of diagnosing battery trouble, with attendant harm to both car owner and battery service station alike.

Resolutions by
THE ELECTRICAL DIVISION OF THE
AUTOMOTIVE ASSOCIATION
Relative to Cell Voltage Tests on Storage
Batteries

RESOLVED:
That is to the best interests of the battery owner for battery service stations, in dealing with

starting and lighting storage batteries, to recom-mend to the owner of such a battery that it should be opened for inspection and possible repair, if while on the charging line, it fails to develop a voltage in all cells of at least 2.4 volts, subject to conditions and restrictions as follows:

1. The charging rate at the time of the test must be the average of what most battery manufacturers consider a normal rate for a battery of so many plates and size per cell at the end of the charge, or roughly, one ampere per positive plate, unless plates are unusual in thickness or

2. The temperature at the time of reading must not be over 90 deg. F., or if greater, a correction of .01 volt for each 4 deg. rise in temperature above 90 deg. shall be added to the reading. Increased temperature lowers voltage.

3. The test can only properly be made when the general instructions for completely charging a storage battery have been completely carried out, or until the voltage and gravity in all cells has stopped rising for two hours. A battery failing to develop normal voltage should be left on another twenty-four hours, unless dead cells are evident.

4. The test shall not be considered to hold to the extent of opening a brand new battery until steps have been made to possibly rectify the trouble which might be due to under developing, etc., and which would not require opening.

Resolutions by THE ELECTRICAL DIVISION OF THE AUTOMOTIVE ASSOCIATION

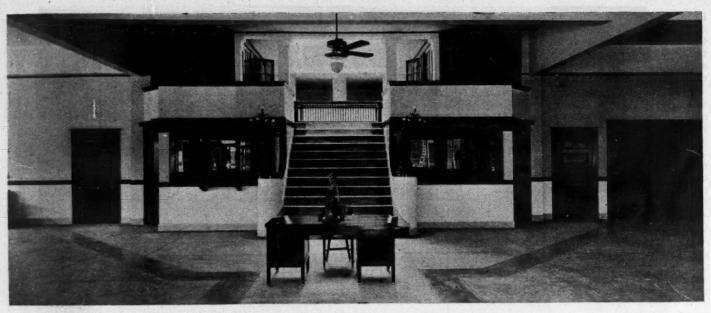
Relative to Heavy Discharge on Incoming Storage Batteries.

RESOLVED:

That it is to the best interests of the battery owner for battery service stations in dealing with starting and lighting storage batteries, when they are first brought in by the customer, to place them under a heavy short-time discharge for the purpose of determining whether there are any bad cells which would warrant the battery being opened and inspected without further tests, subject to the following conditions:

1. Sufficient charge must be still left in the battery, so that the good cells will maintain nearly a normal voltage and so that a decided falling off in any poor cells will indicate that the cells have failed, indicating need for repairs.

2. This test can be carried out, either by placing all cells simultaneously under discharge and taking cell voltages in separate meter, or by using a so-called high-rate tester with voltmeter attached, which places each cell under discharge separately, showing the voltage on the voltmeter attached, provided, that in the second case, due allowance is made for the drop in voltage through the points of the cell tester.



This shows the mezzanine floor of the Crockett Automobile Co. The salesmen's offices are upstairs, while the general office, manager's office and accounting offices are on the ground floor

# Make Your Surroundings a Silent Salesman

The Crockett Automobile Co., San Antonio, Tex., Has Studied the Psychology of Selling and Has Individual Showrooms, Where the Customer and Salesman Will Not Be Interrupted

WHEN the Crockett Automobile Co., San Antonio, Texas, decided to put up a new building, William Steinhardt, the proprietor thought a great deal about the psychology of salesmanship. He believed a customer could be sold more easily if the surroundings were of the proper kind. That is why Mr. Steinhardt designed the building with individual showrooms. A customer can concentrate more easily if he is in a quiet comfortable room, with the car in front of him and where he will not be interrupted.

The individual showrooms are finished in mahogany, with silk draperies. The furniture and other fittings are such that the rooms have the appearance of a library, rather than a showroom. The concrete plastered walls are white and the baseboards of marble. Dome lights. with indirect system of lighting produce an attractive effect, while in the main showroom, a cluster of lights supported by statues adorn the newell posts on the stairs. There are two entrances to the building one of them being divided into two individual showrooms incased in glass, one for Hudson and the other for Essex cars.

The idea of the two individual showrooms was prompted by the fact that Mr. Steinhardt's experience along these lines was that there are no interruptions; the salesman feels free to let himself out; the conversations are not overheard and the customer does not wander around looking for other models. Directly in the rear of the salesrooms are the accessory and parts departments, a showroom for used cars and the service department. In the parts department which is devoted only to the lighter parts carried in stock, there is an investment close to \$25,000. The heavier parts, such as transmissions, axles, etc., are carried in a warehouse.

The service department is one of the

most complete in the city. It has an entrance on one of the main streets, with an exit in the rear, which eliminates any complications as to traffic. Something like \$47,000 has been spent in the erection of this building, which is a one story structure, built of concrete with front and side almost entirely of plate glass. It has a frontage of 90 ft. and depth of 60 ft.



Another view of the Crockett Automobile Co.'s showroom. At the right is one of the

# The Dealer Equipped for Service Wins

While the Selection of the Tractor Best Fitted to Its Particular Locality Is Important, If the Service Behind It Is Not Right, a Successful Business Cannot Be Built Up

BY FRED M. LOOMIS

M ORE and more the importance of the individual dealer is beginning to manifest itself in the tractor business. This applies alike to his sales methods and his service. Indeed, efficiency in both commonly is found together. No tractor dealer can hope to become the dominant factor in the tractor trade of his community if he relies upon efficiency in the one branch of his business to the exclusion of efficiency in the other. No matter how good a salesman the dealer may be, unless his service department is equally efficient, he cannot succeed, and, contrivise, a service equipment alone, without the accompanying requisite of sales ability, is equally hopeless.

One of the things which makes the deepest impression upon the observer who goes from town to town is the fact that success in selling tractors does not, apparently, rest alone upon the type or make of tracter the dealer may sell. It happens once in a while, of course, that special local conditions, determining which type of tractor shall be best fitted for that particular locality, is the deciding factor. In cases like this, other things being equal, that dealer who is fortunate enough to sell the most adaptable tractor will secure the bulk of the trade. But such instances are rare.

#### Dealer the Decisive Factor

More commonly it happens that any one of a half dozen or a dozen different makes of tractors will give a satisfactory account of itself under the conditions found. If the territory happens to be one in which orchards predominate, for instance, there will be at least a half dozen tractors, any one of which will perform satisfactorily and which may be the predominant choice of the buyers according to circumstances. Or, if general agriculture should be characteristic of the region, a still larger number of machines will qualify. Thus it comes about, in a majority of instances, that success in leading the trade cannot be attributed primarily to the tractor. There must be some other factor which is determinative of results.

A wide experience among a multitudinous variety of conditions leads inevitably to the conclusion that this decisive factor is the dealer. There is no other possible way to account for the fact that in one town the Celtrac, let us say, shall control the bulk of the business, while in the very zext town, under identically the same conditions, it will be the Fordson, or the Moline-Universal, or some other tractor which will be the leader.

Were there not such a wide difference in the volume of trade as actually exists in localities which are comparable in all other respects, one might suspect an inherent advantage in one type of tractor over another, but the differences in trade volume appear to be the result rather of the efforts of the dealer than of the tractor, because under practically the same conditions first one tractor and then another will be in preponderate demand.

This being the case, too much emphasis cannot be put into the admonition that the dealer, since it is he upon whom success depends, be most particular in fitting himself for the job of selling tractors. While the ability of individual dealers will differ, of course; while one man may have a greater natural aptitude for the business than another, it does not follow that the dealer is foredoomed to failure, or even to take second place, unless there should happen to be some other man who has a better conception of trade possibilities than has he and who better prepares himself to realize on them. In other words, any good dealer can be a leader in the tractor trade of his community if he will take the pains to equip himself properly to meet the responsibilities of the business and if he will follow approved methods of merchandising and servicing. This always assumes, of course, that the tractor the dealer sells shall be one which will meet satisfactorily the average of conditions in his vicinity.

Perhaps the truth of this assertion best can be illustrated by telling briefly what a few dealers who are leaders in their respective communities have done to attain that position.

#### Comparing Tractors in Orchards

In order that we may be entirely fair in this matter and so that there may not be in any single case one circumstance even which shall favor one dealer more than another, the examples will be confined to localities where the demand comes almost exclusively from one class of customers and for one kind of tractor. Let us take orchard localities. True, the orchards themselves may differ in character, but the conditions under which the tractors must work are practically the same, differing only in latitude.

There is a strip of country along the Pacific Coast, reaching almost from San Diego in the extreme southern part of California, to a point in Washington, in the latitude of Seattle, which is dominated throughout its extent by orchards. The fact that the orchards in California grow oranges and lemons and that the orchards in Washington grow apples makes no practical difference.

It happens, too, that certain types of tractors, or makes of tractors, are especially adapted to orchard cultivation. There are perhaps a half dozen of these. The significant fact which proves that on one of them has any preponderate degree of merit over any other is the fact that throughout this strip of country all these machines are sold side by side. In nearly every community all, or nearly all, are sold to a greater or less extent. Furthermore, in every community the man who owns and operates any one of these tractors ordinarily is well satisfied with it and will approve of it for the orchard work he has to do. Therefore, it would appear reasonable to conclude that the International, the Fageol, the Samson, the Fordson and the Cletrac are indifferently successful in orchard cultivation and that, where all are represented in any community, as they are in many, any marked difference in the sales volume as between the makes must be due to something besides the tractor itself.

#### The Dealers Who Lead

There is at Pomona, Cal., a concern, E. Hinman & Son, leading the field with the Fageol. At Riverside and Ontario the International tops the sales under the control of the Shaw Buggy Co. Harrison P. Smith, with the Samson,, leads the field at San Jose, Cal. L. E. Simmons at Eugene, Ore., has put the Fordson far to the fore and the Hood River Garage at Hood River, Ore., has forged to the front with the Cletrac. In all of these instances there is not just a small numerical superiority of sales, but the disparity in favor of the concern instanced is, in each case, so marked that its lead is overwhelming.

In fact, in every one of these cases the dealer mentioned so far surpasses all of his competitors in volume of business that the conclusion is inevitable, that it is something about the sales and service methods of the individual dealer which has given him his dominating position.

E. Hinman & Son, Pomona, Cal., sold seeds and fuel for years. The business was founded years ago by the senior Hinman, but now is managed by the son. In the course of events the discovery of oil in southern California, with the increase of fuel oil consumption, threatened to wipe out the fuel end of the company's business. Not relishing this young Hinman began casting around for something with which to bolster up the volume.

Just about the time he began his search, something like three years ago, the small orchard tractor began to attract attention. The country around Pomona is all orchard and Hinman saw in the growing popularity of the tractor and in the extension of its use in the orchard not only a trade possibility but the means wherewith he might rehabilitate his own business.

At that time the Fageol was the only orchard tractor being built on the Coast, so Hinman made overtures to the Fageol people for an agency connection. Mind you, never before had Hinman had any connection with the automotive business, but he sensed right from the start that if he should undertake to sell tractors and if he could hope to satisfy his custimers it would be necessary for him to give service on the machines. own standing in the community was such that he had no doubt of his ability to sell the Fageol, but he realized his limitations when it came to preparedness for service.

So, immediately he decided to go into the tractor business, he bought an old garage, hired a competent mechanic or two and announced his readiness to undertake automotive repair work. He knew it would be some time before he would have tractors enough in the field to keep his force of mechanics employed on them, but in order to be ready when the call came he anticipated his need by preparing himself.

#### Assured Buyers of Service

Well, Hinman applied his personal selling ability to the distribution of tractors and as he had been granted considerable territory from the beginning, he had no trouble, what with his reputation and standing in the community, in inducing a few orchardists to try out the Fageol. He assured them he was equipped and prepared to give service and he kept his word in this respect.

To-day his garage business has outgrown its old quarters and he is building a new building in which he intends to keep on with his general automotive repair work and at the same time give all requisite service on the many tractors he has in the field. Inasmuch as no other tractor dealer in his town has taken the same pains to prepare for service, and inasmuch as tractor owners in Hinman's territory have experienced the value of the service he gives, there has been no difficulty in Hinman getting a decisive lead over all of his competitors. In his territory, just because of his foresight, the Fageol leads all the rest.

The Shaw Carriage Co., an implement concern, has had a store for years at Ontario, Cal., and within the last year a branch has been put in at Riverside. Both places are all but smothered in orange groves. In these groves the company has put more International tractors than all those their various competitors have been able to sell. In fact, the Ontario house last year sold more International tractors at retail than did any other agent the International Harvester Co. had in the whole country.

The company first visualized the possibilities of the orchard tractor trade.

Its experience with orchardists was to the effect that work in the orchards was the kind that had to be met as emergency work—any old time would not do. In the days when all this work was done with horses the orchardist had to hustle, and the condition would be no different under power methods. So when the company went to the orchardist and induced him to substitute a tractor for his horses it knew that unless the tractor could be made available at all times the substitution would result in an injury rather than a benefit.

So what did the company do? It put in the most complete stock of parts carried by any tractor dealer in that section and it let the orchardists know that no matter what befell, or what part of the tractor got out of order or broke, both the immediate service of the company and its stock of spares were at his command. Furthermore, the company lived up to its representations and gave such service that every orchardist knew he would not be delayed in his work an instant longer than was necessary to get to him, and that always in stock was the part he might want to make repairs to his machine in case of accident.

So this company built up a trade on the International tractor in the face of the competition of other dealers which is the envy of everybody in that part of the state. It was accomplished by taking pains to see that every man who bought an International was taken care of. The other tractor dealers did not do this to the same extent, hence they fell behind in the competitive race.

At San Jose, Cal., Harrison P. Smith leads with the Samson. It really matters very little that the majority of the tractors Smith has out are of the old style Sieve Grip machine, because he is starting right in to repeat the success he had with the old by selling the new model M Samson.

#### Carried Service to the Orchards

Smith was a pioneer in the tractor business in his locality and from the time he began, now something like ten years ago, he made it a matter of policy to see that every tractor he sold was kept at work. Being a motor car dealer he had, of course, his repair shop and a force of mechanics to fall back upon in making this policy good. But he did even more than that. Not only did he throw the facilities of his shop open to his tractor customers, but he put in a complete line of repairs and trained a portion of his men so that they became expert tractor mechanics. They specialized on that sort of work and carried tractor service right to the orchards where it was needed the most.

In all he has to-day five tractor mechanics who do nothing but travel his territory in service cars. Three of these devote their time to the old Sieve Grip machines, while two are attending to the new Samson. In the case of the latter Smith considers he has a duty to perform inasmuch as he is introducing it, so after a tractor is delivered and

started his men keep in touch with it and see that it always is in the pink of condition and working properly.

In this way Smith not only assures himself that every tractor he puts out stays at work, but he satisfies his customers and impresses them with the fact that whatever the emergency Smith will be right on the job and take care of their troubles. As his service is more personal and asiduous than is that of the other local dealers he gets the bulk of the trade.

When E. C. Simmons at Eugene, Ore., made up his mind to engage in the tractor business, his brother, L. E. Simmons, at that time a traveling salesman for Deere & Co., Portland, resigned his position, took one of his brother's Fordsons, with all the equipment in the way of farm tools which would be sold with it, and retired to the family farm. Here he stayed six months, familiarizing himself with the operation of the tractor and the adjustment of the tools. At the conclusion of that time he felt himself competent to undertake the selling of the machines.

He came to Eugene and opened up a place apart from his brother and put in a line of tractors and power equipment. He took over the selling himself and started out to convince the farmers that power methods were better than horse methods. First he analyzed his territory thoroughly, picking out the best and most influential farmers and concentrating his attention upon them. His evident skill with the tractor and his ability to adjust implements properly inspired confidence in his methods and it was not long before he was making headway.

#### Is a Power Farming Specialist

Installing a complete stock of spares and a properly equipped service department he proved to his customers that at all times he was in a position to serve them and take care of their troubles in case they had any. He had made himself a power farm equipment specialist and as such he did not have to wait very long before he had convinced a satisfactory number of farmers that he knew what he was talking about. He assured his customers that his tractor and its attendant implements would do certain things for them, and then he saw that his word was made good by his service. Now he is in a position where he commands a greater volume of trade than do all of his competitors put together.

The Hood River Garage, Hood River, Ore., took on the Celtrac less than a year ago. The manager of the concern, realizing that he had all he could reasonably expect to do in managing his motor car business and in looking after the service he was determined to give on tractors, took on two brothers named Hartshorn and put them to work. Now it happened that these brothers had been ranchers and cowboys, knew the needs of the farmers and spoke their language. They were assured by the manager of the garage that he would stand behind them

(Concluded on page 53)

# What the Service Department Expects of and Owes to the Owner

The Owner Must Realize the Value of Good Drivers and Operators to Obtain the Most Efficient Service from His Trucks

THE modern definition of service means getting the best possible continuous accomplishment from a motor vehicle having due regard for its design, capacity and life. It is obvious that the service department must bend every effort to see that the conditions are carried out which make this possible.

The truck manufacturer, who is actually engaged in selling automotive transportation has assumed certain definite obligations to his customers, which endure throughout the life of the truck. These may be classed as follows:

First: To maintain at all times an adequate stock of replacement parts so that orders may be filled promptly and repair work completed with the least possible delay.

Second: To issue necessary parts catalogues and instruction books covering his various models from which material needed for repairs may be ordered intelligently.

Third: To furnish his customers and dealers such technical information in the form of bulletins or service letters as will assist them in maintaining their trucks.

Fourth: To investigate carefully all complaints regarding the performance of trucks and if the owner or his drivers are at fault, to convince them of this condition, or in case the trouble has arisen through a defect in construction, material or design to take such steps as may be necessary to correct it in the particular case and also to prevent a recurrence of the difficulty.

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Fifth: To keep a complete record of all trucks built, including the numbers or other identifying marks on the various units entering into their construction, so that orders for parts can be filled promptly and accurately, also information furnished the owners for insurance or other purposes or the police in cases of theft.

Sixth: To answer promptly all of the numerous questions asked by the customers in connection with the operation or repair of their vehicles and to afford them every possible assistance so that satisfactory results may be obtained.

Seventh: To keep an accurate record of all parts shipped so that executive officials or the engineering department may be advised from time to time how well the various units are standing up in service, as a guide to future designs.

Eighth: To keep a record of new trucks shipped and also to keep trace of trucks which have changed hands, so far as it may be possible to do so. BY HENRY R. SELDON

Service Munager, Seldon Truck Corp., Rochester, N. Y.

Here is presented one of the papers delivered at the Service Managers' Convention, held at Indianapolis recently. In subsequent issues of MOTOR AGE will be published extracts from more of the various talks given. The dealer and service man are vitally concerned with what the factory is doing regarding service and these articles should prove of much value to them.

The owner or dealer must realize that his order, inquiry or complaint is but one of the many passing through the service department and should be compiled in a clear and definite manner in order that it can be disposed of with a minimum of delay and the least possibility of error through a misinterpretation of their wants. Probably twenty per cent of service inquiries and complaints are held up for want of definite and complete information.

Customers and dealers will continually use the name of the owner of the truck without stating either the type or the chassis number and a letter or telegraph inquiry, often involving the loss of three or four days, must be despatched in order to ascertain the type of vehicle and chassis number.

Customers, garage men or dealers who are unwilling to spend the small amount of time necessary to secure and embody this information in their inquiry or order can hardly expect efficient service.

#### Proper Use of Forms Saves Time

The service department has certain definite methods for handling different classes of work. Special forms have been prepared for the ordering of repair parts, presentation of claims for adjustment or replacement and for other purposes. The proper use of these forms and the furnishing of complete information in the first instance eliminates the necessity of writing or telegraphing for further details and greatly facilitates the handling of such transactions.

The truck manufacturer and his customers have certain interests in common and the closer they co-operate the better for all concerned. The owner is interested in conserving his investment, getting the most work out of the truck with the least expense for replacements and above all a minimum of time lost for repairs. The manufacturer is vitally interested in seeing that the truck gives

an efficient performance in every possible way, not only because of the moral obligations attendant on its sale but also in view of possible future business.

The service department is the medium of contact between the manufacturer and the owner—it handles all matters following the sale of the truck and the future success of any firm is largely in the hands of its service department.

There is a wide difference between real service and the mere merchandising of repair parts-it is a comparatively simple matter to accumulate a stock of replacements, but to handle them successfully, keep definite quantities on hand in the face of a fluctuating demand, to anticipate the emergency when there is a sudden call for a particular class of material, maintain the various record systems necessary for the conduct of a properly organized service department and, above all, to keep the owner continuously sold on his trucks, to convince him that the factory at all times has his interests at heart and only too pleased to do anything within reason for him, is a very different matter. This is in fact the difference between the real service, which a manufacturer strives to give and the mere selling of repair parts.

The truck manufacturers' service department can not successfully meet all of these obligations without considerable co-operation from the customers and dealers this involves:

First: That all parts orders be clearly written if possible including the manufacturers serial or ordering numbers for the material needed.

Second: A statement of the type and chassis number of the vehicle for which parts are wanted.

Third: Complete address in cases where the customer only purchases parts occasionally also full instructions covering the shipping and billing particularly where the shipment is intended for another party, as a dealer ordering repairs shipped direct to an owner.

Fourth: Written confirmations of all telegraph or telephone orders should be mailed the service department as a check on the transmission of the messages.

Fifth: A duplicate copy of the order as entered is mailed the customer and it is his obvious duty to check this over carefully, notifying the service department immediately of any errors or omissions

Sixth: Material returned to the factory for credit or other purposes should be properly tagged to identify it and a complete statement of all the facts in

(Concluded on page 33)

# Automobile Painting an Opportunity for Dealers to Extend Service

Rural Districts Especially Offer Possibilities, Owing to the Much More Destructive Effects of Mud and Grit on Car Finishes

A TRIP through most any part of the country reveals a bigger demand than ever for automobile painting. As in the case of the repair shop and service station, history is repeating itself. A few years ago service stations and public garages were confined to the larger cities. Now we find automobile repair shops, service stations, vulcanizing shops, battery charging stations, and similar institutions pertaining to the upkeep of cars in towns of practically every size. The automobile paint shop is following in the path of these institutions and going to the smaller towns.

The country driver, the farmer and the small town business man who drive on country roads, with their mud and grit, actually need more automobile painting service than the city drivers who stay on the boulevards most of the time. Which is one of the chief reasons why the automobile dealer of the small town should look into the proposition of adding a paint department, as suggested in last week's issue.

#### College of Instruction

As stated in last week's issue, a representative of Motor Age looked into the methods used by the Chicago College of Auto Painting, 20 East Jackson Blvd.,

PART II

and found that the institution was doing a creditable work in the way of bettering the work of men now engaged in painting motor cars, and also getting away on the right foot, those contemplating putting in a paint shop in connection with their other service work.

The complete course covers the general subject of painting, flowing, dipping, spraying, baking, striping, monograming, pigments, vehicles, solvents, japans, driers, tools and materials, advertising, cost keeping and shop management.

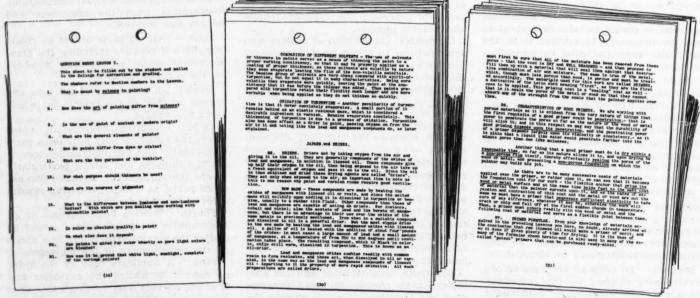
In addition, the man taking the course is given a consulting privilege for life, so that he might take up with the institution any problems that may occur on any particular job not ordinarily found in the annals of everyday motor car painting. The concern also furnishes plans and specifications by means of which a shop can make up its own spray booths, flowing, dipping and baking outfits, etc.

The subject of cost-keeping and shop management is thoroughly gone into, so that the dealer painting cars can accurately and carefully figure costs and management. Plans are furnished by which a new paint shop can be laid out, or the present layout remodeled. Color charts are furnished that enable the painter to get correct combinations of colors. Several sample pages of the lesson books are shown on these pages. The lessons are kept intact by means of a loose leaf binder.

In the course are taken up the different methods of removing the old paint where necessary, when it should be removed, how the old paint surface should be prepared before applying the new coat. It tells how to handle paints and brushes for the best results, what coats to apply for different jobs, proper sequence of coats, how to rub down properly, what varnishes to use under different conditions, etc.

#### Spraying Is Quick and Costs Less

Spraying is one of the modern methods used in automobile paint shops and accomplishes beautiful, smooth results. It is much easier and quicker than brush work, reduces the cost of the job and enables one to handle more jobs in a given time. It is especially desirable for painting commercial vehicles, where the finish is put on as a protection, rather than an ornament. Wire wheels and such parts can be sprayed much more



Sample pages taken from the twenty-four lesson books, covering all the phases of automobile painting. These instructions have been prepared to give a scientific knowledge of paints and affords a foundation on which a person can proceed with the study of the specific materials used in motor car painting. This work is supplemented by the actual work with the painting kit. The two twenty-four inch panels are painted and varnished and portions of them cut off to be sent in for criticism and advice. Much information is contained in these lesson sheets regarding different labor saving devices to be used in the paint shop, many of which can be made at little expense with material readily obtainable

easily than brushed by hand and with better results.

There is another phase of automobile painting which this course takes up and that is flowing. It is a very important part of the business. The hood, fenders, etc., are so conspicious on a car that they must have an absolutely smooth finish, free from brush marks. This process was illustrated in last week's issue of MOTOR AGE.

In order to do a good job, parts like the fenders, hood, lamps, etc., must be enameled and baked. The enamel is first flowed on as mentioned above, after which the parts are put in a baking oven. Equipment for this was shown in last week's issue also. While the equipment shown in connection with this article was rather costly, the reader should not get the impression that this is necessary in all cases. Excellent home made equipment can be made at little cost, which, by the way, will be taken up in detail in subsequent issues.

#### TRUCKMEN BAND TOGETHER

Minneapolis, June 23-The Twin City Motor Truck Trade association has effected permanent organization. It is the successor to the preliminary organization known as the Twin City Commercial Car Men's association. The meeting of seventy-two truck dealers was held just midway between the two automobile centers of Minneapolis and St. Paul at a cafe dinner. All truck dealers of the two cities were made eligible to membership. Men in allied lines will be taken on in an associate membership to be formed. Congressman Walter H. Newton of Minneapolis discussed good roads and motor transportation. He pledged his own support of measures which will advance improvement of highways in the United States.

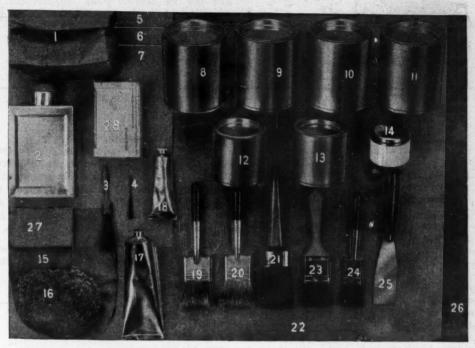
Officers chosen are: President, Harry I. Dafco; vice-president, C. E. Will; secretary, W. E. Smith; treasurer, J. A. Donnelly; directors, E. W. Brehm, J. C. Compton, W. R. Stephens, G. E. Holmberg and L. Miller. Three more are to be chosen.

This completes organization of the automobile trades. The tractor men and the tire dealers have a northwestern organization. The automobile trade has separate organizations in the two cities. The garage owners have associations in each city and the motorcycle men have organizations.

#### FIRE DESTROYS 200 CARS

Rockland, Me., June 23-200 automobiles were destroyed in a \$650,000 fire which started in the Central Garage and raged for five hours in the heart of the business section this morning. The Central Garage is a brick building and owned by the C. H. Berry Trust and Mrs. C. H. Berry, was worth \$60,000 and the furnishings, George M. Simmons, proprietor, exclusive of automobiles, \$15,000.

#### PAINTING KIT



- Powdered pumice stone for rubbing coats of color-rubbing-varnish.
   Pure gum spirits of tur-
- pentine.
  3. Sword striper, for strip-
- ing.

  4. Monograming pencil, for monograming.

  5, 6, 7. Sandpaper.
- Primer and sealer, dries in 24 hours and requires no sanding.
- 9. Roughstuff.
- 10. Rubbing varnish.

- 15. 16.

- Color rubbing varnish.
  Finishing varnish.
  Brush keeping varnish.
  Stiff putty.
  Chamois skin.
  Sponge.
  Automobile color.
  Ground color.
  Badger-hair brush (double thick), for color rubbing varnish.
  Badger-hair brush (double thick), for finishing varnish.
  Oval bristle brush, for roughstuff.
- roughstuff.
- METAL PANEL TO BE PAINTED BOTH SIDES. Camel's hair brush—for

- 23. Camers and Cross color.
  24. Ox-hair brush, for primer
  25. Putty knife.,
  26. WOOD PANEL TO BE PAINTED ON BOTH SIDES.
- 27. Felt pad, for rubbing coats of color-rubbing varnish.
- 28. Rubbing stone, for rub-bing roughstuff.

#### HOW THE PAINTING KIT IS USED

(Both sides of wood and metal panels are finished.)

No. 1-Side of Metal Panel.

Sanded. Primed. Three coats of roughstuff. Roughstuff rubbed. Sealed. Automobile color coat. Three coats of color rubbing

varnish. Varnished rubbed.

PANEL IS THEN EXPOSED TO THE WEATHER IN THE RUBBING VARNISH. HAVING NO PROTECTION, IT SOON GOES TO PIECES, RESEMBLING THE PAINT COATS OF AN AUTOMOBILE WHICH HAS SEEN CONSIDERABLE SERVICE. IT IS THEN REFINISHED, AS FOLLOWS: Sanded. Sealed. Ground color coat. Two coats color rubbing varnish. Varnish rubbed. Finishing varnish.

(Color changed after exposure.)

No. 2-Side of Metal Panel.

Sanded. Primed. Three coats of roughstuff. Roughstuff rubbed. Sealed. Ground color coat. Three coats color rubbing varnish. Varnish rubbed. Striping and monograming. Finishing varnish. Finishing varnish rubbed to give dull finish.

No. 1-Side of Wood Panel. Sanded. Primed. Three coats of roughstuff. Roughstuff rubbed. Sealed. Automobile color coats. Three coats color rubbing varnish. Varnish rubbed.

PANEL IS THEN EXPOSED THE SAME AS NO. 1 SIDE OF METAL PANEL, AND REFINISHED AS FOLLOWS: Paint is chipped with knife, then sanded. Sealed. Puttied. Automobile color coat. Two coats of color rubbing varnish. Finishing varnish.

(Color changed)

No. 2—Side of Wood Panel.

Wood Panel. Sanded. Primed. Three coats of roughstuff. Roughstuff rubbed. Sealed. Automobile color coat. Three coats color rubbing varnish. Striping and monograming. Finishing varnish.

After each important operation, a piece of the panel is cut off and sent in to the college for criticism and comments. The above work is repeated until the work of the student shows he has mastered the operation. The sizes of the panels are such that they give exactly the same kind of work as met with on the panels of a car. It simply amounts to the student's working on one automobile body panel, and when he comes to do a good job on one panel, it is but a repetition to do a good job on the entire body.



# EDITORIAL



Will the Steam Car Come Back?

THESE days we hear of many new concerns experimenting with the steam car. Some concerns have virtually concluded their experiments and their models are said to be extremely successful in operation, burning the lowest grades of fuel and

producing power at unheard of rates.

Is the steam car likely to be the future car, thrust upon us because of the fuel situation? Or, are we to have our present passenger car engines revised toward more economically and efficiently burning the lowest grades of fuel?

The steam car undoubtedly offers great possibilities as far as the fuel situation is concerned. Considering the extent of experimental work accomplished so far with the gasoline engine and the great sums of money expended, and our present position, it is not amiss to say that fairly practicable and efficient designs would have been evolved had anything like proportionate sums been expended for the development of the steam car.

Is it because of the tremendous inertia acquired by the gasoline engine car that those likely to be interested have been intimidated, and have had their horizon clouded by the demand of the public, educated only to the gasoline engine car? One important thing to consider though, and that is that performance is the sole determining factor. The present day car, with all its attendant complexity-its ingeniously complicated engine, the carburetion system, the electric system, the cooling system, and what not-is a wonderful performer. The average car placed in the hands of a novice can be made to do stunts that are almost unbelievable. But perhaps the steam car if offered the same chance would perform equally as well. Only until it has been thoroughly tried out, in the light of the experience gained through past failures, can we tell this. Because the steam car once had its inning, was once tried and did not measure up to requirements, it does not seem reasonable to condemn it forever from consideration.

Vs. Automobile News

NEW YORK newspapers have taken the lead in barring Automobile Publicity from their columns all so-called "automobile publicity" and their action is likely to be followed in other parts of the United States. The ruling has been so drastic that it impresses the

observer that the journals are leaning over a bit backward and that they are taking an unjustifiable stand which they soon will have to reconsider. They have gone so far as to bar all mention of automobiles, extending even so far as not to print the name of a car winning a race such as the 500mile sweepstakes at Indianapolis.

Dealers may not attach much importance to this news, but this lack of interest is merely an indication of to what depths the so-called publicity has sunk in popular esteem, Publicity is extremely important for the automotive industry, but to be important it must be real publicity, not the "puffs" and guff of the past.

Motor Age believes that the dealers should take more interest in the factory publicity. The dealer, being more closely in touch with his territory than the factory publicity department, should know better than it what sort of publicity will benefit him. And from this knowledge he should cooperate with the factory publicity department in shaping the factory's efforts.

In succeeding issues, Motor Age will present articles on publicity service which it believes will be of real benefit to its readers.

Railroads and the Motor Trucks

BEFORE there can be a wide expansion in the use of motor trucks in this country we must work out our proper relationship to the railroads, because the railroads always will to a large extent control the transportation methods.

In this respect it is well to recall what C. A. Morse of the railroad administration said:

"Considered as a unit practically none of the small branch railroad lines feeding trunk lines pay expenses. The traffic gathered by them is turned over to the main line with a deficit attached, which has to be overcome during the main line movement before any profit is made. It would be a decided advantage if this traffic could be delivered to the trunk lines by means of motor trucks."

One of the chief reasons why the highways of this country have fallen short of carrying their quota of freight is because it has been only within the last ten years or so that the old time ox-drawn and horse-drawn vehicles have given way in sufficient measures to the modern motor truck. In other words, we did not have the proper medium. The highways of the country could not be looked to for any assistance, because our inventive genius, manufacturing skill and resources had not applied itself seriously to the motor truck

It is to be hoped that the future will see a big increase in the production of farm products, made possible through the introduction of motor trucks in farm haulage, which proposition hardly as yet has been touched. There are in this country over six million farms and if only one-third of them should apply trucks in the next five years there will be over two million trucks assisting the farmers in getting their produce to town or to some shipping point.

It is the farmer to whom the dealer in the small town should seriously look to for his future truck sales. With increased production likely sure to occur with the more widespread use of tractors, it stands to reason that the farmers will have to look to some other means than horsedrawn vehicles to carry their produce to distributing points. The motor truck is the only logical answer. Not only will it carry produce to town, but it can be used in the fields as well. Roads, too, will be getting better and better, so that there will be all the more incentive for farmers to invest in motor trucks.

# Horses at a Premium In Oregon Cities

#### Gas Shortage Brings Dobbin Back Into Favor in Portland and Prices Go Up Accordingly

PORTLAND, Ore., June 19—Even a gasoline shortage has its humorous side, and the shortage so acutely affecting business and transportation in Oregon has brought out amusing incidents. One of them is the amazing number of horses that have suddenly reappeared on the roads and in the city streets. Apparently, all this talk about "the passing of the horse" must be taken with reservations, or else some Oregon people have been hoarding up horses for such a contingency.

At any rate, more horses have been pressed into service than were supposed

to exist. Lame horses, halt horses and whole of Oregon is to-day suffering from the family pasture and hitched to conveyances. One farmer in the Willamette Valley had a Ford car but no gasoline to run it. He had sold his wagon, so he hitched a horse to the Ford and drove to town with a load of produce.

The moth ball has achieved undeserved prominence. Somebody announced that moth balls dissolved in kerosene made a fine engine fuel. Immediately there was a rush for kerosene and moth balls. Hardly a moth ball re-

mains undissolved in Oregon to-day. There was also a rush on drug stores for ether to be used for the same purpose, and the stocks of ether went down so fast that the hospitals had to ask that sale of it to motorists be stopped. It was no great loss, for the kerosene-moth ball-ether mixture has not been a pronounced success.

The gasoline profiteer also has appeared, chiefly in the person of some thrifty truck driver. Being allowed 75 per cent of his tank capacity at any filling station, the driver would fill up at one station, retail his gasoline at \$1 a gallon to some needy motorist and drive to another station for another tankful.

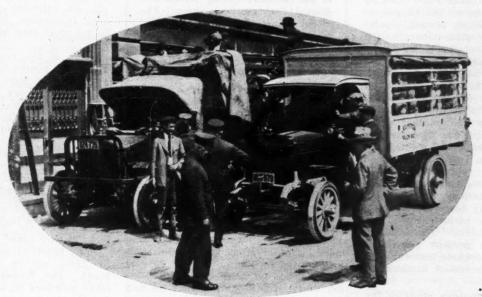
#### DISTRIBUTOR HOLDS "PEP" MEET

Bloomington, Ill., June 18—Pep promotive gatherings are held quarterly by Dayton Keith, Fordson tractor distributor for the central Illinois territory.

He arranged a program for June 7 at Bloomington that brought in 150 sub dealers of the thirty-five counties he controls. Representatives of implement companies, manufacturing machines used in connection with tractors were present. After a demonstration in the morning of the various machines and talks by the factory man, the dealers heard a series of addresses that proved instructive.

A. E. Hildebrand, national tractor association demonstrator, gave a talk upon the best method of conducting district demonstrations. Harry White, assistant manager of the Chicago branch of the Ford company, discussed the importance of service in the success of the tractor industry. F. L. Rockelman, manager of the Indianapolis branch of the Ford company spoke upon the importance of a special tractor department. C. S. Williams, manager of the St. Louis branch of the Ford company, told of the methods

#### Breaking the Harbor Tieup



Motor trucks were called upon recently in New York to break the tieup resulting from freight congestion

he uses in developing the use of the tractor the year around. J. J. Pitts, a Bloomington banker, made the final talk upon the subject of sane finance and big production. An open discussion followed, participated in by many of the dealers and numerous questions were asked by the dealers and were answered by the experts present.

#### ENJOIN STRIKERS FROM PICKETING

Cincinnati, June 21—Queen City lodge, International Association of Machinists, and Auto Mechanics lodge, both of Cincinnati, have been enjoined from "interfering or molesting" employees of the U. S. Motor Truck Co., Covington, Ky., under a temporary order issued by Judge A. M. Cochran in Covington Federal Court. Judge Cochran also enjoined the company from ceasing manufacture of trucks.

#### Philadelphia Dealers in Used Car Association

Move to Stabilize This Part of Business Is Object of Organization—Discuss Sunday Closing

PHILADELPHIA, June 19—Philadelphia now has a second-hand car dealers' organization. It is known as the Philadelphia Used Automobile Dealers' association and includes owners of most of the leading used car exchanges here. The object of the organization is to protect both buyers and dealers.

Samuel Gorson, of Gorson's Automobile Exchange, presided at the initial meeting and addresses commending the move and suggesting methods of building up a strong organization to establish

lish high standards in the used car business were. made by Louis Block, president of the Philadelphia Automobile Trade association; J. E. Gomery, of the Gomery - Schwartz Motor Car Co.; Charles Blum, of the Charles Blum Advertising Corporation; Milton Stern, president of the Auto Transit Co. and Maxwell Pestcoe.

The subject of Sunday closing was discussed in detail and after the advantages of the plan to the public, as well as to the salesmen in the various establishments had been brought forward, the members

adopted a resolution to close on Sunday, beginning this month.

#### HOLDS DEMONSTRATION TOUR

Fargo, N. D., June 19-The Horton Motor Co. ended to-day a novel advertising demonstration of the Maxwell-Chalmers line. It was an educational tour lasting 43 days, covering 2615 miles, in which 172 towns were visited and 35,000 persons were reached. The exhibit, which had been made of Maxwell car and truck chassis and Chalmers chassis by the Horton company at the Fargo automobile show was carried on Maxwell trucks at the rate of 16.7 m.p.h. average over roads which were one-third of the time almost impassable. In all there were only two replacements. Gas consumption was 11 to 14 miles per gallon and oil consumption 800 miles to the gallon. The company plans to make the tour an annual event.

#### Army Trucks Start On Transcontinental Tour

#### Cabinet Officials Participate in Ceremonies When Transport Corps Machines Leave Capital

WASHINGTON, June 21—Ceremonies, in which cabinet officials and high army officers participated, marked the departure of the fifty trucks comprising the Motor Transport Corps convoy for the trans-continental trip. The crosscountry tour from Washington to Los Angeles under the auspices of the War Department will be an acid test as to the fitness of various types of commercial vehicles. One of the chief studies will be the relative value of pneumatic and solid tires for trucks under all conditions of travel. The data obtained by the government experts on this trip will figure more or less prominently in the establishment of standardized motor equip-

The fifty motor trucks were lined up at the zero milestone on the Ellipse, to the south of the White House. Secretary of War Baker paid tribute to the meritorious service of the motor transport during the war. He declared that the motor vehicle had proven itself an essential factor in the system of national defense. Secretary of Commerce Alexander stated the rapid growth of the automobile industry showed that a national highway system was necessary for the nation's progress. He pointed out that for every dollar spent in these good roads projects the return would be a hundredfold. The Secretary of the Navy was inclined to believe that aviation would be sufficiently developed within a century to lessen the nation's dependence on land transportation. He asserted, however, that the present generation would require an adequate highway system to meet the increased demands of commerce.

Aside from the intensive study of the motor vehicle under operating conditions, it is the intention of the Motor Transport Corps to preach the doctrine of good roads. From the standpoint of the Army the trip will be beneficial in many ways. It will afford the officers and personnel an opportunity to observe the behavior of their motors under varying conditions. The interest aroused in this official trip is expected to have a favorable reaction in increased enlistments.

The trip will be made by easy stages. The itinerary provides for a total mileage of 3690 with average daily mileage of 44.5. The convoy is due at Los Angeles, California, September 17, the eighty-third day. Sunday will be observed as a day of rest. Secretary Baker presented a wreath to Col. John Franklin, convoy commander, to deliver to the mayor of Los Angeles.

Only one and one-half ton trucks, all equipped with pneumatic tires, were in the convoy. In the tour made over the Lincoln highway last year, solid tires predominated. It is expected that the

pneumatic tires will be subjected to hard treatment because of the stretches of bad roads reported.

The convoy will use the Bankhead highway which is described as an all-weather route to the Pacific coast. Among the speakers at the formalities to-day was Governor Harding of the Federal Reserve Board. He eulogized the late Senator Bankhead of Alabama as the "father of the good roads movement." The governor urged the extension of the highway systems throughout every state.

The motor transport unit at full war strength is accompanied by a service park unit, an engineer detachment and a detachment from the Medical Corps. The convoy carries complete repair sets so that replacement will not delay the travelers.

Fremont, Ohio, June 21—The passing of the horse again is demonstrated in the action of the Sandusky County Horse Owners' Mutual Protective association, which has been rechartered as the Sandusky County Automobile Mutual Protective association. The Horse association has been in existence many years, and is a flourishing institution. The advent of the automobile relegated the horse to the "has been" class and practically every horse owner now is driving an automobile.

#### THIS BANKER FAVORS CREDITS

Wilmington, Del., June 18—John S. Rossell, president of the Security Trust and Safe Deposit Co., in an address before the Wilmington Automobile Trade association, a few days ago, noted the widely spreading and diversified use of the automobile, including a traveling automobile bank, which recently came under his observation, "taking the bank to its customers," as he put it.

He touched on bank credits in relation to the trade, stating that he had approved a loan for the purchase of an automobile to a customer, a working man, who showed that it would be a saving in time and transportation cost to himself and fellow workers in getting to the plant where they were employed. He expressed his faith in the automobile as a factor in the working out of the great destiny of America in the world, by which a permanent accumulation of wealth will be built up.

#### USE TRACTORS FOR ROAD WORK

Clinton, Ill., June 18—Central Illinois cities are buying tractors for road grading which are equipped with rubber tires so that they will not damage pavements. The tires are of block construction. Clinton and Springfield are among the places that have bought rubber tired tractors and others are conducting an investigation and making tests. There is a general feeling that horses should be abandoned for hauling the heavy grading outfits and that tractors should be substituted because of the lesser expense.

# Buffalo Dealers Stage Farm-Truck Demonstration

#### New York Association Members on Two Weeks' Educational Tour In Rural Regions

BUFFALO, June 17—Eight representatives of the Buffalo Motor Truck Dealers' association are demonstrating trucks on a two weeks' tour which started from Buffalo Monday, on a 600-mile tour through small farming communities in this territory. The tour swings up along Lake Ontario through the rich orchard country, turning south at Batavia, N. Y., and entering the truck farm and later the milk, oil and wood producing districts, returning to Buffalo on June 26.

Twenty-eight Buffalo dealers were expected to participate, but disagreements and misunderstandings developed during the last two weeks of preparation, due to the activities of two large tire companies. Efforts were made to bridge the gap by rejecting the tour slogans of both companies, but it was impossible to get more than eight dealers into the tour.

Some of the dealers who stayed at home are predicting that the tour will not continue more than a week, and some of them are known to have sent salesmen into the territory, ahead and behind the tour, to close the prospects that are being made by the demonstrations.

The tour was designed to appeal directly to the farmer and the itinerary contained no towns of more than 20,000 population, concentrating especially on the small farming communities of 200 to 1,000 farmers. Camp equipment was carried and the participants slept in tents at each night control.

Many practical demonstrations of motor truck use on the farm are being made. The farmers are gathering in large numbers at all of the stops, and despite the fact that the Buffalo association is not fully represented on the tour, the motor truck idea is being sold to the farmers effectively and, on the whole, good results are expected.

#### OVERLAND TO EXPAND

Toledo, June 21—Stockholders of Willys-Overland at a meeting this week approved a plan for underwriting 600,000 additional shares of common stock. They also authorized an increase from nine to twelve directors, electing J. R. Harbeck, vice-president of the American Can Company, George Peck, president of the Moline Plow Company, and E. R. Tinker, vice-president of the Chase Securities Corp., as the new directors.

The coming of new strong financial interests into the Willys organization is credited to the efforts of Walter P. Chrysler, vice-president and general manager and former vice-president of General Motors Corp.

At the meeting it was decided to maintain the headquarters of E. B. Jackson, sales vice-president, in New York.

#### California Probes Into Alleged Gasoline Profiteering

#### Violations of Lever Act Are Charged Against Pacific Coast Oil Companies

OS ANGELES, June 21-Charging that some of the biggest oil companies in Southern California are conspiring to throttle oil production through unfair and discriminatory tactics and that they in a measure are responsible for the alleged shortage of gasoline, United States District Attorney J. Robert O'Connor launched a searching probe today with a view of placing crystalized evidence in the hands of the Federal grand jury. Attorney O'Connor said today that he hoped to have some of his charges in the hands of the grand jury by Friday of next week and he may ask for indictments that will be of a sweeping nature.

The blanket investigation is far reaching and virtually every oil company in Southern California will come within the probe. Hundreds of officials of the oil companies in Los Angeles and adjacent cities including the gasoline service station agents, salesmen of the companies and engineers and pumpers at the various producing wells will be called in

the quiz.

It is considered probable that O'Connor will ask the grand jury to return one or more indictments charging violation of the Lever Act in restraint of trade.

Viewed in the light of having direct bearing on the local gasoline shortage it is known that certain of the big oil companies have been engaged in steady export of vast quantities of their products to foreign markets.

In this connection figures placed in the hands of O'Connor show that the oil and gasoline exports from Los Angeles port for the month of May reach the total of \$969,203. Of this export the amount of gasoline was 2,353,594, gallons of a valuation of \$526,038.

While it is understood that a large part of this export for May was mostly to coastwise cities, including Alaska and British Columbia, it is reported that some months the oil companies export 2,000,-000 gallons of gasoline alone to China.

Among the tactics the heads of the various oil production companies are alleged to have indulged in according to the United States district attorney is that of advising their men at the producing wells to keep the production down to a minimum.

It is further claimed the oil companies have instructed salesmen to tell supply station proprietors they must buy lubricating oil of the same manufacture as the gasoline or they cannot have the gas-

#### BOSTON TO HOLD TRUCK SHOW

Boston, June 21-Boston will be the only one of the three big cities to hold a truck show next Winter. At the annual meeting of the Boston Automobile Dealers' association it was decided to hold the show next March as usual and to include trucks.

At the annual meeting held this week the board of directors was enlarged from nine to eleven members in order to provide larger representation of the trade. John H. MacAlman of the Stearns-Knight was reelected president; F. A Hinchcliffe of the Jordan, treasurer, and Chester I. Campbell, clerk and secretary.

J. S. Hathaway, manager of the White Co. branch, who has been vice-president for many years, resigned because his company is no longer engaged in the manufacture of passenger cars, and J. W. Maguire of the Pierce Arrow was chosen vice-president.

#### TRUCKMEN DISCUSS ACCIDENTS

Boston, June 21-At the final meeting of the season of the Motor Truck Club of Massachusetts last night at the Boston City Club matters of importance were discussed and it was voted that a committee be sent to the conference relating to accidents, announced by letter from

Chicago, June 21-Here is this week's prize story:

The pathfinder of one of the principal touring organizations in the middle west has recently been embarrassed because of numerous complaints she has received regarding the inaccuracy of her speedometer directions. These complaints were so frequent that she decided to make an investigation.

She checked over many of her roads and could find no discrepancy in her figures, but an examination of her car disclosed that when new equipment of tires had been put on, one oversized tire had been put on a front wheel and another on a rear wheel with regular "standard equipment" tire on front and rear. The result have been inaccurate readings.

So two months of pathfinding work must be done over.

Vehicle Registrar Frank A. Goodwin, to advocate enforcing the ordinance against children climbing on vehicles and also some means to prevent drivers coasting down hills with trucks. The conference takes place at the State House next week.

President James J. Scully called attention to the propaganda being spread to curtail the weight of loads on motor vehicles and advised the members themselves to check it. Other speakers were Day Baker, James T. Sullivan and Secretary Dwight Sleeper.

#### CURTISS STOPS BUILDING

New York, June 19-C. M. Keys, the vice president, announced here yesterday that the Curtiss Aeroplane and Motor Corp. has abandoned all plans for the further construction of commercial aircraft. All the plants except the Garden City plant will be closed. Work on replacements will continue however.

#### Kentucky Motorists Pay Cent Tax on Gasoline

#### Brings Price of Fuel to 30 Cents Per Gallon-Service Stations Collectors

OUISVILLE, June 20-Beginning at midnight last night, automobilists began paying an additional cent a gallon for gasoline, due to operation of the tax enacted by the last general assembly.

Prices quoted vesterday were twentynine cents a gallon, thus bringing the cost of gasoline to thirty cents a gallon.

Dealers will report sales to the county clerk once a month and pay the state

The money so raised will be used for the benefit of the autoists, going into the state road fund, and thence into permanent highways.

The oil companies have arranged with their service stations for the collection of the tax by making gasoline retail for thirty cents a gallon, tax-paid, and small dealers will follow the same course. Dealers buying from wholesalers will not have to pay the tax then, but will collect from the consumers.

The dealers will have to report once a month to the county clerk, paying all taxes collected and showing amount of sales, both wholesale and retail. One report will be checked against the other, so that the state road fund will not lose a single penny. No allowance even will e made for evaporation.

It is estimated that Kentucky consumes an average of 4,000,000 gallons of gasoline monthly the year around. This will mean an average of about half a million dollars annually for road purposes in this state.

#### TO HANDLE U. S. EQUIPMENT

Chicago, June 17-American automobile accessories and equipment will be handled by a new selling organization which has been formed by the County Chemical Co., Ltd., of Birmingham, England. The new organization will function under the name of British Sales. Ltd., but will be run in connection with the parent corporation.

The Chemical company is one of the oldest established automobile accessory jobbing concerns in England and is in close touch with the trade throughout the British empire. The company also plans to enter the American market with the sale of British made accessories. J. Roland Kay Co., Conway Bldg., Chicago, is American representative.

#### LIMIT "IN TRANSIT" SIGNS

Indianapolis, June 21-"In transit" signs, placed on machines traveling through Indiana from factories to dealers, do not comply with the Indiana automobile registration law, according to an opinion of Attorney General E. Stansbury.

Automobile manufacturers sending cars through the state must comply with registration laws of the state in which they are made.

# \$7,000,000 of Road Work Being Done This Year in Georgia

TLANTA, GA., June 18-Following A very closely upon the heels of a recent decision handed down by the Georgia courts that the state highway law passed by the last Georgia Legislature, under which the State Highway Board was organized and is now operating, is null and void because of a technical defect in the method of its passage. the State Highway Board has made its annual report showing that during the past year \$2,000,000 worth of road work was completed in Georgia and that more than \$7,000,000 worth is now under actual construction. All of this work comes under the direct supervision of the board which has done more for good road building in this state than all other factors combined. And all this has been done since last September when the board was first organized, less than a year ago.

Coming at this time immediately after the courts have decided that the board is really operating contrary to law the annual report is particularly interesting for it shows what an elaborate and thoroughly efficient organization has been perfected. The actual expenses of operating the board has cost the state to May 1st, \$144,596.68, the report states, and this is certainly a mere bagatelle as compared to almost ten million dollars worth of road work for which the board is responsible. Of this amount of road work, as previously set forth, \$2,000,000 worth of it has already been completed, \$7,000,000 worth, representing 143 contracts, is now in the actual process of construction, and contracts have been let for an additional \$1,251,-355.84, bringing the entire total to even more than \$10,000,000, for the latter projects will be under way before the end of the present year.

The report of the board further shows that virtually all of the federal aid projects which were delayed by the war and during the entire period of the war, are now under way. Also that the loard has distributed for road work to the various counties about \$2,000,000 worth of government trucks. All this has served to give Georgia fourth place among all the states of the Union in the progress made to avail itself of the federal aid funds, according to the Bureau of Public Roads at Washington.

Just what will be done about the state board continuing its work because of the court's decision remains a matter of conjecture, but it will probably be taken care of at the next session of the Georgia Legislature, which is scheduled to convene the latter part of this month. At this session also will come up the most important question of completing the program for a thorough system of highways throughout the state.

It is probable that a bill will be introduced to amend the state constitution in order to provide for the issuance of bonds to finance the state highway work.

If passed, and it now appears evident that it will pass easily, the voters will decide upon the issue at the polls. The amount to be voted upon will probably be either \$40,000,000 or \$50,000,000, more likely the latter figure, and officials of the Georgia Automotive association who have been in close touch with the situation throughout the state are confident that the issue would carry by a big majority.

#### PERMIT TAXIS AGAIN IN MEMPHIS

Memphis, Tenn., June 18—Permits granting license to a limited number of chauffeurs to stand near hotels and certain places in newly restricted traffic district will be issued by the fire and police and commissioner's office, who recently gave orders clearing all taxis from up town streets. The drastic regulations were made necessary because of disturbance between chauffeurs and the nuisance many of them caused by annoying prospective patrons. In the future specific stands will be indicated.

#### MUNICIPAL GARAGE FOR PHILLY?

Philadelphia, June 21—The advantages of a municipal garage, or four sectional municipal garages were discussed by a special committee of the common council investigating the modus operandi of caring for the city's 200 municipally-owned motor cars. At present these vehicles are stored in private garages at a cost of thousands of dollars annually. The valuation put upon the city-owned cars is upwards of \$200,000.

Sentiment in favor of a municipal

garage, centrally located, crystallized at the meeting. Mayor Moore is strongly in favor of it. It was disclosed that since the city has shut down on "joy-riding" in the municipal motor cars by the families and friends of the department heads, the gasoline bills have almost been cut in two.

The garage question soon will be decided.

#### LEXINGTON GIVES SERVICE

Boston, June 21—Treasurer A. H. Sowers of the Lexington Automobile Co. has mapped out a plan of sending to Lexington owners from time to time some device relative to operation of cars which will be useful to them and to all motorists.

#### THREE PER CENT OF GAS WASTED

Washington, June 20—Three per cent of the total gasoline production of the country is wasted. The Bureau of Mines investigation report shows that the aggregate loss per year from evaporation is estimated at 122,100,000 gallons in the Mid-Continent field alone. At 22 cents per gallon, the loss in terms of dollars is reckoned at \$26,880,000. It is claimed that the portion of the gasoline wasted is the most valuable because it is the lightest. Investigators asserted that this portion of the gasoline, if saved, would command the highest value.

Evaporation of crude oil during storage shows a high rate. Data obtained in many investigations by Federal agents brought the conclusion that the greater part of the loss is on the lease when the oil is still fresh. Relief from the gasoline shortage would be accorded in a small measure, the experts believe, by protecting the oil from free contact with the air.

## Oregon Voters Overwhelmingly Approve Doubling Indebtedness for Good Roads

PORTLAND, June 20—By an overwhelmingly affirmative vote, the people of this state have just voted to continue the extensive good roads program now under way in Oregon. At the recent primary election they adopted an amendment to the state constitution doubling the indebtedness limit for road bonding purposes.

The previous road bonding limitation was 2 per cent of the assessed valuation, and under it virtually \$20,000,000 in highway bonds have already been issued. The constitutional amendment just adopted increases this limit to 4 per cent, just doubling the amount of road bonds that can be issued. Under it the legislature can issue \$20,000,000 additional for bonds, making \$40,000,000 in all. Of the new \$20,000,000 available, \$10,000,000 already has been authorized.

Under the financing plan adopted by the legislature, the entire road bond indebtedness of the state up to the \$40,-000,000 limit will be retired, both as to principal and interest, from money received for automobile licenses and a state tax of one per cent per gallon on gasoline. However, authorization of the new \$20.000,000 of this sum imposes no additional burden on motorists, for the plan has been in operation, both as to automobile licenses and state gasoline tax, for the past year.

The action of the people insures early completion of a hard-surfaced Pacific Highway for the entire 350 miles of this great road in Oregon between the California and the Washington state lines. For the past two years Oregon has been reconstructing the highway and by the end of this summer more than half of it will be paved. Because of much heavy construction work it will be another two years, and perhaps three, before the huge job is completed. But by that time every foot of the highway within Oregon will be paved, and with no grade exceeding five per cent.

Some idea of the construction problems

the rebuilding of the highway has presented may be gained from the fact that its route lies over five mountain ranges, including the Siskiyous, where it crosses into California at an elevation of 5,000 feet.

Paving of some of the new grades along the highway will be delayed by the new policy of the state highway commission, to the effect that no new grade shall be paved until it has "set" for at least one year, and in most cases two years. This action is the result of experience which has shown that paving new grades too soon causes rapid deterioration of the pavement through settling.

#### OPEN NEW SERVICE STATIONS

Memphis, Tenn., June 18—The Hoover-McClintock Motor Car Co. will open a handsome new service station about July 1. The firm is headed by J. W. Mc-Clintock, a prominent business man of Belzoni, Miss., and incorporated under the laws of Tennessee at \$98,000. The company has been temporarily located at the Chisca Hotel.

The New Washington Garage, now under construction, will be opened about Sept. 1. This building represents an outlay of about \$50,000. Jolin Zent and Ike Gronauer will act as co-partners.

#### TIRES OF BEING "GOOD FELLOW"

Hartford, Conn., June 18—A Hartford tire dealer is sick of being a good thing for other dealers handling questionable goods and has called a halt. It has been the custom of other dealers devoid of tire changing equipment to send their customers to the dealer in question. Now being a good fellow once in a while is all right the dealer holds, but, there is a limit. Now the strangers are taxed 50 cents per wheel for tire changes. Regular customers are served gratis.

### California Protests Brings Washington Investigation of Gasoline Prices

W ASHINGTON, June 18—Investigation of the charges made by the California Automobile Trade association as ordered by the Attorney General this week is regarded as the beginning of a nation-wide inquiry into the existing shortage of gasoline. The Pacific coast organization alleged that certain oil companies have created an artificial gasoline shortage and instituted a rationing system. It is their contention that the "present propaganda will be followed by an increase in price."

The assistance of the Department of Justice was directed to the conditions existing in California. Senator Phelan submitted the charges of the California Automobile Trade association as signed by George Haberelde of Bakersfield, president, and Robert W. Martland of Oakland, secretary. This association has 3000 members.

The instructions issued by the Attorney General to the Federal District Attorney for Northern California cover only the investigation as to unlawful combinations or conspiracies in restraint of trade. Senator Phelan of California has other governmental agencies inquiry as to the necessity of an embargo on oil and gasoline from Pacific ports. It was charged that the California oil companies are complaining of a gasoline shortage while steadily increasing their export business.

The automobile trade association favors hearings which will bring out the real facts. They contend that the publicity which would result from these sessions would assure justice to the three thousand members. The organization points out that the gasoline shortage is costing merchants millions of dollars.

The fact that California is one of the chief sources of oil supply lends unusual significance to the accusation entered against the oil men. The report of the Federal Trade Commission submitted to Congress two weeks ago shows clearly that the inquiry was only superficial. Senator Phelan has placed the matter before several cabinet officials, having assurances of their co-operation. Legal proceedings depends largely on the report of the Federal District Attorney for California.

#### FORD SHIPPING BY WATER

New York, June 20—Due to the railroad difficulties, the shipment of Ford cars to New England points in barges has been undertaken by the Ford assembling plant at Kearny, N. J., the first two such consignments having gone forward within the last few days to New Haven, Conn. The plan, it is believed, will enable dealers to receive their cars at a cost less than that for either driveaways or rail forwarding.

The Ford plant is situated on the Passaic River, only a short distance from New York, and it has been the practice for some time to lighter all the export shipments from the plant to the docks at New York for transference to the oceangoing steamers. Consequently, expansion of that service to New England points has not been difficult.

#### TO SHELTER TRAFFIC POLICE

Hartford, Conn., June 18—Agitation in this city favors the protection of traffic policemen with some sort of canopy especially during the hot weather. The proprietor of a battery service station has taken the matter up with the police department and has offered to start a popular fund with a substantial subscription to provide the protection if the city will not do jt.

#### DEALERS RELIEVE GAS SHORTAGE

Portland, Ore., June 20—Temporary relief from the gasoline shortage that is paralyzing business in Oregon will be achieved within the next few days through action of the Dealers' Motor Car Association of Oregon, which has contracted with an independent oil company in Los Angeles for immediate delivery of forty carloads of gasoline, approximating 200,000 gallons. The Southern Pacific railroad has promised to rush the shipments on passenger train time.

This gasoline is not intended for consumption in Portland, where rigid conservation has made small rations for passenger cars and 75 per cent rations for commercial vehicles possible, but will be distributed to towns throughout the state. The gasoline will be sent to dealers in these towns in carload lots, the association requiring a cash deposit of \$1,000 for each carload, the remainder to be paid when the car reaches its destination.

## Rochester's "Concrete" Roads Prove to Be About as Hard as Sandstone

ROCHESTER, June 18—Advocates of concrete roads in this section of the state are having rather a difficult time figuring out just what is the matter with the particular brand of improved roads which they have maintained would stand up under heavy traffic of the present day better than the ordinary bit of bituminous macadam roads.

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The latest concrete road to show signs of crumbling away is a portion of the Geneseo-Mount Morris highway. The concrete road is a little more than 1½ miles in length and was constructed last year at a cost of about \$42,000. According to the story told by engineers before the road was put in, the people were informed that the road would last for many years. A strip of concrete 8 ft. in width on either side of the road with a 5-ft. strip of macadam in the center was the way the road was built. Nothing was said about the life of the macadam strip, but it was supposed that this would

have to be repaired several times in order to hold out as long as the concrete strips.

Observations made by engineers along several of these roads of a similar character show that at every joint the roads are commencing to go to pieces, in spite of the fact that a preparation was placed on the joints to bind these sections of the roads together.

After being used less than a year the Mount Morris-Geneseo road, supposed to be a model highway, not only in Livingston county, but in adjacent counties, is in a bad way. By another season, in the opinion of road experts, these roads will be in a deplorable condition and practically beyond repair.

Various kinds of improved roads have been constructed in this section, but the kind found to be the best is one with a concrete foundation with an asphalt preparation for the top. Several of these roads have been constructed.

#### Eastern Service Men Hold Big Outing

#### New York, Newark and Brooklyn Combine for Picnic and Games at Bear Mountain

NEW YORK, June 19—The first annual excursion and outing of the Automotive Service associations of New York, Newark and Brooklyn to Bear Mountain was even more of a success than the planners had hoped for, even in spite of unfavorable weather conditions. Nearly 400 service men from the three organizations turned out for the games, sports and eats. Rain in the early morning mussed many of the chowder shoes out old Jupe Pluvius changed his mind just before the boat started from the dock and the sports program was carried out as planned.

The trip up the Hudson was enlivened by a real jazz band, and the boat committee, headed by Joe Gorey, kept things moving until the landing at Bear Mountain sometime after noon. After partaking of a chicken dinner, Charlie Tate took charge of the games. A baseball game between Brooklyn and New York was partly finished on one part of the field while the other contests took place elsewhere. These consisted of the usual number of dashes, shoe races, threelegged races and so on. Men, women, kids and all had a chance to get in and win some of the prizes which were donated by the trade. In addition to the prizes to individual winners, points were scored for each of the associations according to the number of wins by their members. The result was that New York received 17 points, Brooklyn 7, and Newark 4. A winged Victory statute therefore becomes the property of the New York association until another association wins it from them.

Altogether there were over forty prizes, valued at about \$450, and there was keen competition to get hold of them.

The outing was intended to get the service men more intimately acquainted with each other than they ever had been before, and it certainly succeeded in this respect. It was not intended that there be any profit as a result of the sale of tickets, and the price was based on the approximate number that the three associations expected to sell. With the very bad weather early in the morning there was no doubt that many who had not previously bought tickets did not come, but even at that, there were sufficient number sold to pay the expenses and have a few dollars left over.

This was the first service men's outing held in the East and it was so successful that the committee immediately decided to hold another one next year.

#### OPEN NEW SERVICE STATION

Altoona, Pa., June 18—The Autocar now has a permanent home in this city through the completion of a large garage and sales building for the F. H. Felt-

well Co., 927 Nineteenth Street. It is equipped with all the features of a first class service station and will be devoted to truck housing and service. The building is 175 by 40 feet and is two stories high, with the main entrance on Nineteenth Street. On the first floor are the main office and showroom. The second floor contains a private office, and an automotive equipment stockroom, every part of the Autocar being represented. The storage room, which will be used exclusively for motor trucks, is 135 by 40 ft. It has space to care for upwards of 100 cars. Directly in the rear are the service station proper and machine shop. This department is 40 by 40 ft. and is equipped with a complete outfit for repairing trucks, including an overhead trolley and hoisting system.

#### HAS NEW SERVICE PLANT

Philadelphia, June 11—The Philadelphia Nash Motor Co. is planning an extensive sales and service campaign especially for Nash Quads. The company, with this end in view, has opened a new truck service station. It is equipped to care for both passenger car and truck service, with special stress on trucks. More than 10,000 sq. ft. of floor space is afforded at the new quarters.

#### Los Angeles Mechanics Strive for "Closed Shop"

#### Dealers Take Steps to Head Off Any Troubles with Employees by Posting Open Shop Notices

L OS ANGELES, June 20—There is a well defined movement here among automotive mechanics to bring about closed shop conditions. Makers, dealers and garage owners are aware of the situation and will combat it to the extent, if necessary, of closing their establishments rather than submit to unionization. This is an open shop city in almost every line of labor, and nothing so alarms employers as activity on the part of union agitators to bring about the closed shop.

A meeting of 100 employers representing the automotive industries was held and at that time it was disclosed that union representatives have come here recently from other coast points with the avowed intention of establishing a union among the mechanics. Union meetings have been attended by secret service representatives of employers and to date nothing has been accomplished by the agitators. The present whereabouts of the agitators are known and they are being carefully watched.

Some semblance of trouble has appeared in several of the garages. The plan of the union workers is to accomplish their purpose by word of mouth solicitation. Their one idea, it seems, is to obtain a ninety cents per hour scale regardless of class of work. Under the open shop principle employers are paying their mechanics according to what they deem them worth.

#### Kansas City Workers Ask for 44-Hour Week

#### Advance in Wage Scale Also to Be Demanded by Automobile Shop Employees

K ANSAS CITY, Mo., June 20—It is reported that the motor mechanics of the Machinists' union are planning to establish a wage scale under a forty-fourhour a week schedule July 1. The wage set is said to be \$1.121/2 cents an hour for mechanics with four years' experience who have proved efficiency; shorter experience and lower efficiency to be paid less. At present, there is no established wage scale for motor mechanics, and few are paid as much as the maximum wage in the proposed schedule. Under present circumstances many garagemen foresee serious difficulty in raising prices to the public, which course would be necessary if higher wages are paid mechanics. There are about 600 mechanics now members of the union, it is said; and about as many more mechanics who are not members. A drive is being made, pending the proposed institution of the scale, to get members. Garagemen have no permanent organization, and have failed to establish uniform hours for work.

Most of the motor car dealers have been on a time schedule of around forty-eight hours a week for a year or so, the shops closing for nights and Sundays, and usually early on Saturday afternoons. Even truck dealers are generally on a basis of doing no work at night or Sundays in their service departments. There has never been any question raised in motor car dealers' establishments as to union or non-union workmen; and this week, carrying out this principle, signs are being posted stating that the shops are, as they have always been, "open."

#### FARM LIGHT MEN MEET

Bloomington, Ill., June 18—100 Alamo Farm Lighting System Dealers of Illinois and Indiana, attended a four-day school of instructions, June 7, 8, 9, and and 10, arranged by C. U. Williams, distributor, at Bloomington, Ill. J. B. Turner, of the Hillsdale factory, was in attendance and gave talks on service. There were also discussions on salesman and other phases of distribution. The school was arranged preliminary to an active fall campaign to be launched July 1.

#### KEEPS SERVICE OUT OF SIGHT

Hartford, Conn., June 18—A passenger car and truck dealer here has issued orders to his service force that no work is to be done on cars in the street in front of the salesroom. The dealer holds that such practice makes a bad impression on the buying public. The service force has been instructed to send cars into the service station or to go into the yard back of the salesroom.

# Chicago Faces Necessity of New Traffic Rules

#### Municipal Garage, No Parking in Business District and One-Way Streets Are Suggested

CHICAGO, June 20—Chicago is the latest city to join the movement for a municipally owned and operated garage in the downtown district. It has been proposed that the city build a two-level garage in Grant Park, adjacent to the shopping and business district and pay for and maintain the structure from fees charged for parking cars.

The garage proposal comes as the result of traffic conditions in Chicago which have become almost unbearable. The downtown streets are now so crowded during the business hours that it is nothing short of miraculous that the daily toll of accidents is not ten times what it is. Various means to reduce this congestion have been suggested and action is likely to be taken to this end at the next meeting of the city council.

One proposal is to convert all the streets in the downtown or "Loop" district into one-way thoroughfares. This would be done by having north and south traffic on alternate streets, as, for instance, Wabash avenue would carry only southbound traffic, State street only northbound, Dearborn street only southbound, etc. The cross-town streets would carry east and west traffic on alternate streets, as, for instance, Madison street would carry westbound vehicles, Monroe street eastbound, Adams street westbound, etc.

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Another suggestion would do away with all parking in the district comprising the "Loop," bounded by Michigan, Lake, Market and Van Buren streets. This ordinance would permit automobile or other vehicle stops only to load or unload passengers or merchandise. The present traffic ordinances forbid parking in those loop streets on which there are car lines between the so-called rush hours from 6 to 10 a. m. and from 4 to 7 p. m.

#### DELAWARE A. A. HOLDS MEETING

Wilmington, Del., June 18—The Delaware Automobile association, at its semi-annual meeting, held in Wilmington recently, the executive committee was directed to design a new radiator emblem for the cars of members. The emblems will remain the property of the association and will be protected. Announcement was made at the meeting that Capitol Trail signs are to be placed shortly on that part of the Lincoln Highway in Delaware.

#### PIERCE COMPANY REORGANIZED

Buffalo, June 19—At the annual meeting of directors of the Pierce-Arrow Motor Car Co. the reorganization begun several months ago was completed.

President John C. Jay, Jr., was named chairman of the executive committee and will divide his time between New York and Buffalo. Colonel George W. Mixter, former vice president and general manager, becomes president and will give his full time to the company. Charles Clifton was re-elected chairman of the board. Both Mr. Jay and Colonel Mixter are members of George W. Goethals and Co.

Other officers elected were W. J. Foss, vice president in charge of commercial matters; E. C. Pearson, secretary; M. E. Forbes, treasurer. A satisfactory annual report was submitted.

#### LAKES CARRY MANY CARS

Buffalo, June 20—Lake transportation of new trucks and passenger cars is breaking all records.

The large passenger steamers plying between Detroit and Buffalo frequently arrive with thirty to fifty new machines on board in addition to the daily number of tourists' machines moved. Electric tractors are used to haul the machines from the boats as no gasoline is permitted aboard the steamers, and tanks are drained before cars are taken on board.

#### No Relief Is Felt In Freight Car Shortage

#### Greater Dependence Must Be Placed on Driveways from Factories Than Heretofore

NEW YORK, June 18—The transportation situation so far as it relates to the shipment of automobiles by rail shows a tendency to grow worse rather than better. There has been a diminution instead of an increase in the car supply. The Interstate Commerce Commission has issued regulations which mean, in effect, that only automobile cars can be used for this purpose.

The inevitable result is greater dependence than ever upon driveaways. The automobile cars will be conserved so far as possible for long distance shipments and virtually all the cars sent east will be delivered under their own power. While this adds materially to cost it can be done during the summer months or as long as the highways stand up under the strain to which they are being subjected. Manufacturers are looking forward with dread to the winter.

The Interstate Commerce Commission and the Car Service Commission of the American Railroad association have ruled that flat cars can be used for no shipments which can be carried in box cars. The same regulation has been applied to coal cars which are being confined very closely to the purpose for which they were intended. Theoretically, automobile makers have the same chance of getting box cars that other manufacturers have, but practically the railroads will give them none.

Both regulatory bodies are issuing orders that automobile cars must be delivered to the factories and not used for the shipments of other commodities but the supply of this class of rolling stock is adequate to meet only 25 per cent of the demand

#### Engineer Graduates Are In Demand This Year

#### Class of University of Michigan Finds Numerous Jobs Open In Motor Industry

DETROIT, June 20—Some idea of the demand for engineers in all branches of the profession is demonstrated in the number of applicants for graduates from the University of Michigan. In the mechanical engineering department eighty students are to be graduated. Every man has a first class position and in addition there are over 300 applications on file from industrial heads seeking graduates for their organizations.

The situation in the department of highway engineering is on a par and between three and four hundred requests for graduates in excess of the number to leave the institution this month now are on file. In the civil engineering department fifty men will be graduated, forty of whom have accepted positions with the Pennsylvania Railroad and the others with the American Bridge Co. In addition to those there are 200 requests on file from various industrial executives.

In the chemical engineering department there were four times as many applications as there are men to be graduated, many of the applications having come from the automotive industry. In the electrical engineering section and also the marine department there are six positions open for every one of the thirty and six graduates respectively.

The demand for engineers bears out the contention of automotive heads and educators who held a conference in Ann Arbor and also in Washington recently to devise plans for educating more men in the engineers' profession. As the result of these conferences steps will be taken immediately and a united effort put forth this summer to establish classes in highway transport and highway engineering when the fall terms begin. Just what action will be taken has not been determined finally, but the attitude of government officials is such that with the co-operation of the heads of the leading educational institutions and automotive executives, fully equipped departments capable of turning out hundreds of trained engineers will be in-

#### MARKERS ROAD OBSTRUCTIONS

Hartford, Conn., June 18—The Connecticut Supreme Court of Errors rules that a so called silent policeman or street intersection marker is a highway obstruction. A New Haven attorney struck one of these markers and he and his party were slightly injured. A lower court awarded him \$3,500 but the city took an appeal. The highest court upheld the decision. Practically every city in the state and most of the towns use markers of this description so that the decision of the supreme court is the more interesting.

# Ford Dealers Hold Meeting At the Detroit Factory

DETROIT, June 19—Ford Motor Co. this week is holding a convention of managers from all over America and the foreign countries following a meeting here last week of the foreign representatives and distributors. W. C. Anderson of Bordeaux, who controls Ford distributions in England, France, Denmark and Spain, H. A. Bato, L. C. Griffin, A. Lee, J. J. Harrington, A. H. L. Davies, E. H. Hampton and E. A. Evans are the foreign representatives attending the convention. Harrington is stationed at Copenhagen, Davies at Cadiz. Hampton at Buenos Aires and Evans in Brazil.

Speaking of the outlook from a merchandising standpoint, Anderson declared the capacity of the factory would continue to be taxed for years to come in meeting the foreign demand, if it were possible to devote the entire output to that field. European countries rapidly are recovering from the war experience, and aside from the great demand for passenger cars, there is a demand for lighter trucks.

Mr. Anderson does not take such a pessimistic view of the attitude of foreign countries toward American vehicles as some others. He declared it is impossible to hope for quantity production over seas and expressed the opinion that the public demand for American cars and trucks would force officials to lift the ban which in many instances has been placed on American vehicles through high import duties.

The same expression was heard

#### BIG TRUCK PROSPECTS IN SOUTH

Oshkosh, Wis., June 20—Extremely optimistic views concerning the future of the truck industry in the South are expressed by Homer Hilton, sales-manager for the Oshkosh Motor Truck Mfg. Co., who has recently returned from a nine weeks' trip in that part of the United States.

"Perhaps the best evidence of what I learned concerning the truck prospects in the South is expressed in the fact that I am adding four salesmen to my force in that territory," says Mr. Hilton. "I believe that the South offers a tremendous field for the motor truck."

#### TWENTY-FIVE TRUCKS IN TOUR

Cincinnati, June 20—Final plans have been completed for the "motorize the farm" tour to be held by the Cincinnati Truck Dealers' association during the week beginning June 21-26. The tour is being held in order to get the message of motorization to agriculturists in this section. A fleet of twenty-five trucks, trailers and other farm hauling equipment will make the tour which will extend over 300 miles through eastern Indiana and southern Ohio, covering in all about twenty-six towns.

throughout the convention, all of the foreign representatives declaring their markets had hardly been touched and insisting that the only question now was one of production in an amount sufficient to meet the foreign demand.

American distributors at the convention sounded a like tone of optimism. While they realized, of course, the cheap car is an absolute necessity, they expressed the opinion that the demand for the higher price cars which in many cases can be classed as pleasure cars would continue. The financial situation in the view of the managers has had little effect on the industry except in isolated instances. Reputable dealers in nearly all sections of the country, they say, are having no trouble in securing help from the banks to finance their business. The attitude of the bankers they say simply is that of caution and while they are scrutinizing carefully all applications for loans no reputable dealer is having any trouble in securing financial aid in any reasonable amount. The convention will continue through Friday. Sessions are being held in the Ford motor plant, administration building.

#### DEALERS TO DISCUSS ACCIDENTS

Boston, June 18—A committee from the Boston Automobile Dealers' association has been invited to attend a conference with officers of other motor organizations to discuss the forming of an organization which will have the co-operative assistance of the Motor Vehicle Registry and which will undertake a campaign along broad lines in the prevention of accidents in Massachusetts. Registrar Goodwin has called a conference at the State House to discuss the methods to be pursued.

#### CHICAGO WINS INTER-CITY RUN

Chicago, June 17—Chicago drivers defeated their rivals from New York in the second inter-city reliability run which was held this week. The tour was a two-day affair from Chicago to Indianapolis and return with noon controls each day at George Ade's farm at Ade, Ind. The Chicago team emerged with a score of 22 8-11 penalties while the New Yorkers received a proportionate assessment of 24. Chicago, with eleven drivers, received 50 penalties, while New York, with five drivers, received 24.

#### COUNTY BUILDS OWN ROADS

Atlanta, Ga., June 19—Without the cost of an additional penny to its tax payers the county of Hamilton in the state of Tennessee, just across the Georgia state line, is going to have ten more miles of new concrete highway, and if the plan succeeds by which this road is to be built it will serve to save the tax payers of that county a round \$100,000.

The road is to be built according to the plan whereby the county, the state and the federal government each contribute one-third to the cost of its own construction. Hamilton county's quota under this plan would amount to about \$100,000, but Hamilton county is going to act as its own contractor, using its own machinery and convict labor, and thereby expects to make enough to pay its full quota. County Engineer E. G. Murrell will be in charge of all the work on the construction of this pike, and will establish grades, locate culverts and make new surveys for the elimination of curves.

The contract is not to be finally operative until it has been approved by federal officials, but so confident are the county officials that the government will approve the contract by the state that the work will be commenced immediately when W. T. Moore, of the Tennessee State Highway Commission, affixes his signature to the contract.

#### GEORGIA DEALERS HAVE OUTING

Atlanta, Ga., June 21-The Georgia Automotive Dealers' Association held a state meeting in Savannah, June 5 and 6, enjoying a steamer trip to Tybee Island Saturday evening and an all day outing there Sunday. It was more of a social affair than a business meeting, though Saturday morning the board of directors held a session, and the members gathered later to hear addresses on salesmanship and merchandising topics. Speakers were William L. Mathers, of Atlanta, president of the association; L. D. Hicks and Benjamin H. Ulmer, both of Atlanta, and Charles G. Edwards, of Savannah. About 150 members were present, the program and entertainment being given under the auspices of the Savannah Automotive Trade Association.

#### USES TRUCKS TO HAUL GRAIN

Stanford, Ill., June 18-Quick handling of grain by motor truck was illustrated by a movement from the Edward H. Linneman farm near here. Six trips were made by the truck from Stanford to Roodruff, 10 miles, with 3350 bushels of corn, in four hours and seven minutes. The six loads, made a consumption of eight gallons of gasoline, this fuel also taking the truck to Bloomington, 90 miles in all being moved. Had horses been used for the movement, three times as much expense would have accrued, while there would have been long delay as compared with the use of the machine.

#### DETROIT STARTS BUS LINE

Detroit, June 17—Without any formal ceremony the initial unit of Detroit's motorbus service began operations this morning with eight cars operating on a seven-minute schedule between Grand Circus Park and Water Works Park. The seven-minute schedule for the time being will be maintained from 7 A. M. until midnight each day. In the announcement directors of the Detroit Motorbus Co. declare there will be no standing in the cars, there are no straps or straphangers, there will be no jamming in the doorway, and the fares will not be paid on the pay-

as-you-enter plan, minimizing congestion in the doorway.

Passengers will take their seats as they enter, and the conductor equipped with an automotive register will pass through the car, the passengers dropping their 10 cent fare. Only 10 cent coins can be used in the register, and persons tendering fares for five people, for instance, will be given dimes in exchange for larger coins, and then will drop them in the box. Children under five, not occupying seats, will be carried free.

The cars are double deckers, and the upper deck will be used by persons who desire to smoke while on their way to and from their business, or on a pleasure trip, as the case may be. The buses will stop at the same corners now used as street car stops on the skip-stop plan. The buses will conform strictly to schedule, insofar as possible, making the trip from Grand Circus Park to Woodward Ave. in six minutes and completing the journey up Jefferson to Water Works Park in a total of 29 minutes.

As rapidly as additional buses can be secured they will be put in operation under a permit from the city, and the directors expressed confidence that the bus lines on all of the main arteries in the city will prove highly successful, and certainly will be a great relief to the present congested transportation facilities.

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# 15,000 Persons Watch Cycle Hill Climb at Rochester

ROCHESTER, June 18—Upwards of 15,000 persons journeyed anywhere from 5 to 50 miles last week to witness the motorcycle hill climb staged by the Rochester Motorcycle club, which consists of dealers in Rochester. The hill has a grade of better than 62 per cent, and within 50 ft. of the top becomes even steeper, so that when a rider reaches that point, unless he is going at a fair rate of speed, he becomes stalled, as gasoline will not feed to the engine at the angle of the hill.

The hill is said to be the steepest in this part of the country, and time after time attempts have been made to scale its heights, but it was not until to-day that a rider succeeded in making the grade.

Andy Ueberlacher, who rides an Indian machine, went over the top of the hill three times with his motorcycle. He made the 400-ft. hill in 17 seconds, 16 2/5 and 17 4/5 seconds. F. B. Towner sent his Reading Standard over the top in one event, but in doing so swerved five feet or more off the course on both sides and was disqualified.

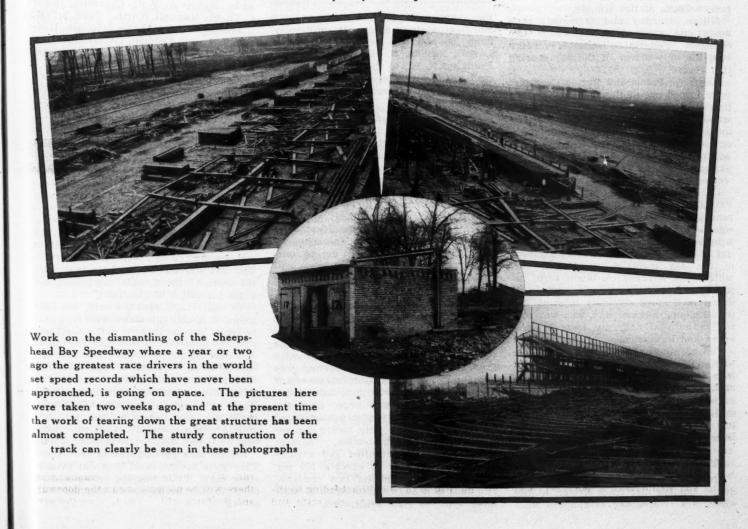
One rider almost got to the top of the hill when the back wheel of his machine caught in a woodchuck hole, and the cycle reared up on its end and hung in that position for about thirty seconds before the rider got back to earth. Another rider skidded on the hill and his machine turned into the crowd, which scattered in all directions, and cycle and rider started to roll down the hill.

A sport model machine, a Harley-Davidson, was piloted 330 feet up the slope before it came to a stop. Three events had been run off before Ueberlacher finally went all the way up and over. Ueberlacher got his machine off to a flying start, climbed up and up, gaining momentum all the way, and when he struck the hard fifty feet he went into it like a cyclone and was over the top in a cloud of dust.

#### OPENS THIRD SERVICE BRANCH

Hartford, Conn., June 18—In order to round out service and take better care of customers, Russell P. Taber, Inc., Hartford, Conn., has opened a branch service station in Manchester. This is the third branch station established.

What's Left of Sheepshead Bay



#### Duesies Make a Clean Sweep At Uniontown

#### Four Places in Big Race Go to American Designer—Milton Wins at 94 m.p.h.

#### HOW THEY FINISHED

 Duesenberg
 Tommy Milton
 2:22:44.36

 Duesenberg
 Jimmy Murphy
 2:23:29.98

 Duesenberg
 Eddie O'Donnell
 2:26:24.45

 Duesenberg
 I. P. Fetterman
 2:28:01.62

 Monroe
 Ralph Mulford
 2:32:54.60

 Frontenac
 Benny Hill
 2:37:25.79

 Monroe
 Joe Thomas
 2:38:03.35

 Monroe
 Roscoe Sarles

U NIONTOWN, Pa., June 19—Fred Duesenberg and his flying quartet of race drivers made a clean sweep of honors in the annual Universal Trophy race at 225 miles here this afternoon. In addition to sending Tommy Milton over the line in first place in 2:22:44.36, an average of 94.9 m.p.h., Duesenberg engined cars took the next three places, Murphy, O'Donnell and Fetterman taking second, third and fourth in the order named.

Only American engined cars finished among the first eight, the places from fifth to eighth, inclusive, going to the Monroe and Frontenac cars, whose engines were designed and built by Louis Chevrolet. Ralph De Palma, driving a Ballot, was forced out midway in the race because of tire trouble.

Milton, Murphy and O'Donnell each made one stop at the pits for tire changes. Fetterman made a non-stop run, the only driver of the day scoring that record.

Ralph De Palma and Gaston Chevrolet were forced out of the race with engine trouble. Roscoe Sarles had engine would which brought him into the pits for a time on the 119th lap, but later reentered the race, having lost his position to Gaston Chevrolet. De Palma and Sarles forced the Duesenberg drivers to bremendous speed.

During the first half of the race De Palma, reported unofficially to have reached a speed of 106 miles an hour, was forced to quit in the 122nd lap with a broken valve. Gaston Chevrolet went out in the 118th lap. The only accident of the day involved the Meteor car, which was wrecked on death turn, injuring slightly Wade Morton, owner and driver; and more seriously injuring Arthur Kaempf, mechanician, who was sent to the hospital suffering from bruises, burns and lacerations.

The crowd was the largest in the history of the speedway. The Duesenberg won \$11,500 in prizes, Milton capturing first, \$5,000, and a second leg of the Universal Trophy race. These prizes are exclusive of the accessory awards. Milton used Oldfield tires and the other Duesenberg winners Goodyear.

#### STONE WINS AT CROWN POINT

Crown Point, Ind., June 20—Larry D. Stone, English dirt track driver, at the wheel of a Duesenberg, established what

is claimed to be a new world's record for a half-mile dirt oval track here when he piloted his machine over two laps in 0:01:00.2. Jimmy Costa, Italian driver, was second, one-fifth of a second behind Stone.

In making his record, Stone was forced to coast in for the last quarter lap, his car having burned out a bearing.

#### SET GYPSY TOUR DATES

Boston, June 18—The fourth annual gypsy tour of the motorcycle riders of Boston and vicinity will be held June 20 and 21. As in former years the riders will go to Weirs, N. H.

The Boston riders will assemble at

Boston, June 17—Automobile men will appreciate this:

"A salesman attending the convention of Commercial Travelers in Boston this week told this one on himself. He was showing an elderly lady the virtues of his car, choosing a runabout route which required him at each corner to extend his arm as a signal.

"The old lady watched him curiously. Finally she craned her neck and looked at the sky.

"'My dear young man,' she said, suddenly patting him on the shoulder, 'you just tend to your driving, it don't look like rain nohow.'"

the junction of Commonwealth avenue and Beacon street at 8 A. M. on Sunday, June 20, and will proceed by way of Lowell, Nashua, N. H., Concord, N. H., Franklin, N. H., to the Weirs. At Concord, a stop will be made for lunch, which will be served without charge to all taking part in the run.

About 6 o'clock Sunday night the tourists will go for a sail around Lake Winnipesaukee. After the boat ride a banquet will be served at the hotel and following the banquet moving pictures of interest to motorcycle riders will be shown.

On Monday there will be a hill climb near the hotel. Early Monday afternoon the riders will start back for Boston. Jes Campbell, president of the Massachusetts Motorcycle association, will act as tour-

### RUSHVILLE, ILL., DEALERS TO ORGANIZE

Rushville, Ill., June 20-Automotive dealers and garage men of two counties met here at a dinner as the guests of the Cass & Schuyler Counties Automotive Dealers' association. The meeting was addressed by F. C. Zillman, secretary and manager of the Illinois Automotive Trade association, who urged upon the dealers the necessity of organization of the industry as the only means for securing adequate protection. Several new memberships resulted and a campaign is under way to effect a 100 per cent membership in the two counties. The Cass & Schuyler association is affiliated with the state association.

# 10,000 Watch Racers Compete at Columbus

#### Dirt Track Event at Buckeye Capital Results in Good Sport and One Accident

COLUMBUS, Ohio, June 20—A crowd of fully 10,000 people was present at the automobile races at the Columbus Driving Park where some excellent time was made on the excellent dirt track at that place. The affair was under the charge of local promoters and as a result considerable interest was manifest. Only one accident occurred and neither the driver nor the mechanician was injured to any extent.

The free-for-all of 25 miles was the

feature

There was a good field of starters in this event and the time was good. F. Sullivan of Cincinnati, driving a Sully Special, won in 24 minutes and 40 seconds. Ben Lawwell, in a Ford gave him a race to the eleventh mile when a flat tire sent him to the pits.

The summaries:

Free-for-all—25 miles—won by F. Sullivan, Sully Special; C. Coleman, Mercer, second; Ben Lawwell, Ford, third; A. Porter, Henderson Special, fourth. Time, 24 minutes and 40 seconds.

Five-mile—open—Ben Lawwell, Ford, first; A. Porter, Henderson Special, second; Bishop A. Wolf, Chevrolet, third; C. Castle, Maxwell, fourth. Time, 5:24½.

Ten mile—open—Ernie Rhoades, Hudson, first; Joe Fielding, Packard, second; C. Coleman, Mercer, third; C. Friend, Mercer, fourth. Time, 9:54.

Five-mile—C. Coleman, first; Bishop

Five-mile—C. Coleman, first; Bishop A. Wolf, Chevrolet, second; C. Friend, Mercer, third; C. Castle, Maxwell, fourth. Time, 5:07.

#### TEMPLAR WINS IN TWO CLASSES

Los Angeles, June 20—The economy run held by the motor car dealers of San Bernardino over the famous Rim-of-the-World route of 101 miles was won this year by a Templar, in the sweep-stakes, a Briscoe, in Class A, a Stephens, in Class B, a Templar, in Class C, and a Dorris, in Class D. The classification was determined by the price of the cars. The test was on the ton-mile basis and the score of the Templar was 52.01 ton miles per gallon of gasoline.

To understand what the cars that participated in this run underwent, it should be borne in mind that the entire distance, with the exception of less than ten miles, was over mountain roads. The cars ascended to an elevation of one mile and remained at that altitude except for thirty miles when returning down grade. There was one succession of switchbacks in which it was necessary to negotiate twelve miles to reach an elevation 3000 feet above the starting point.

Eleven cars participated in the event. They were accompanied by about twenty other cars. Following the return of the party to San Bernardino a banquet was served

# Local Conditions Govern Motor Car Credits

## Summary of Conditions in Various Federal Reserve Districts, However, Indicates General Shortening on Loans

NEW YORK, June 20—Summaries of conditions in the various Federal Reserve districts disclose that, broadly speaking, the financial situation is much the same in different parts of the country. In some respects it is governed by more or less local conditions but the general tendencies are much the same. It is conceded that present difficulties cannot be eliminated without better transportation, less labor unrest and harder work and the curbing of extravagance.

In a discussion of conditions in what are characterized as the "luxury trades," the Federal Reserve Bank of New York has this to say about the automotive industry:

"Although automobiles used for business purposes are properly classed as necessities, pleasure cars are hardly in the same category and it is probably indisputable that the number of the latter now in use is proportionately many times greater than the family horse and carriage of a short generation ago. The attitude of the public with respect to indulgence in such articles and in jewelry as distinguished from good clothing and other goods, the essential character of which is not a matter of dispute, is accordingly of significance at this time. With regard to automobiles, traffic delays which have hampered the manufacturer in procuring raw materials and shipment of product, have greatly hampered deliveries, and this condition, together with the protracted winter season, caused a perceptible let-up in buying in this district for a period of nearly six weeks, followed later by some revival.

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"Some dealers are declining to accept orders for 1921 deliveries, due, it is said, to the uncertainty of prices which will then exist. Without exception, those consulted would like to see reduced prices in order to eliminate the excessive burden and anxiety of financing, although the banks are not discriminating against this trade in the matter of loans. That anxiety, however, is felt among some dealers is evidenced by the fact that one large tire house is said to have cut its advertising contracts, cancelled orders for cars for salesmen, discontinued a building contract, and reduced its credit staff in the belief that it will not require much credit information for the remainder of this year at least."

The New York bank says that calamitous predictions are unwarranted but adds that we cannot disguise the presence in the situation of influences of social unrest and of community price and money inflation, equally without precedent in history, and these may well admonish the business world to sobering thought. An enormous quantity of the world's savings for generations in the form of stored-up capital has been destroyed and cannot for a long time to come be replaced; how can we therefore be justified in viewing complacently the competition of transportation and government to secure at rising interest rates possession of whatever funds remain available?

Following are the opinions from several of the reserve banks districts, in substance:

Chicago—A decided readjustment in the economic and social forces governing our national life are expected. The situation is complicated because business men have no precedents to guide them.

Philadelphia—Determination on the part of business men and bankers to

check further expansion and bring about a healthy liquidation without curtailing essential production and without a shock to industry.

Cleveland—Business men are convinced that national prosperity lies only in a prompt return to a more solid and substantial footing.

Minneapolis — Production in many lines has slowed down because of transportation troubles. Public has begun to realize that a general readjustment is under way.

St. Louis—Observers of economic and business development discern in present symptoms the first real steps towards readjustment and deflation.

Kansas City—Situation is one of encouragement although more or less unsettled conditions will prevail during the slow process of readjustment.

Richmond—The unrest and the uncertainty which has characterized operations in commercial fields has spread to the consumers and they are curtailing purchases.

Atlanta—An exceedingly difficult economic situation is reported. Much unrest still prevails over high prices. "It behooves all classes to co-operate to the fullest extent in an effort to consume less, especially of luxuries, to increase production and avoid speculation."

Dallas—Country-wide tension in the money market has made itself felt. Indications are that the Dallas bank will have to call on other districts for rediscount accommodations through the summer period.

San Francisco—Crop prospects are better than at any time this year, but a labor shortage exists.

#### PROTEST CAR EMBARGO RULING

Atlanta, Ga., June 18—Protesting vigorously against the proposed embargo of the Interstate Commerce Commission on all shipments in cars that can be used for hauling coal as a means of relieving the present congestion, the Georgia State Highway Board has written the commission at Washington, pointing out the many serious results such an embargo would have on road building in the different states, particularly in Georgia.

Virtually all of the road work that is now being done would be tied up for an indefinite period by such an embargo, for the same cars are used to haul road building material as coal; therefore these cars would not be available under the embargo and the road work would have to be abandoned until the embargo was lifted because of lack of material. It is impossible to state how many contracts exactly would be thus effected and

how much money, but some inkling of the enormity of the figures can be gained by what would happen in Georgia. In this state 143 contracts would be effected, according to Dr. C. M. Strahan, chairman of the highway board, and these amount to about \$7,000,000.

The Georgia board in its communication favors an embargo as a drastic means of relieving the situation that the country will not face a coal shortage next winter, but sets forth that the embargo ought to be modified to such an extent at least that it will not put a stop to road building work now in progress.

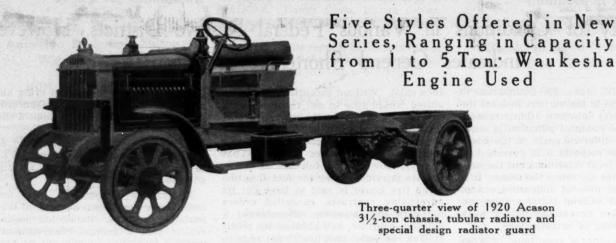
#### MOTOR MAKERS FAVOR WATERWAY

Buffalo, June 20—That automobile manufacturers are very active in boosting the project for canalization of the St. Lawrence river to permit ocean-going steamers to enter the harbors of the great lakes was the statement made at the international commission's inquiry into the project here beginning June 14. Fred B. Niles of Toledo declared the

Overland company and other automobile manufacturers planned to load ocean liners with finished machines if the project is carried out. They believe such a plan would greatly facilitate export movement of American made cars.

The plan is opposed throughout the east, but has the support of an organization representing fourteen central and middle western states. In the east it is contended the New York state barge canal answers the purposes for which the St. Lawrence project is designed and that the expense of completion of canalization of the river alone would cost \$500,000,000 while deepening of great lakes channels and harbors would cost more than that amount.

# New 3 1-2 Ton Acason Lists at \$4900



"T HE most powerful truck in America" is the name applied by the maker of the 1920 series of Acason trucks. Five types of trucks are built in the new series, ranging in capacity from 1 to 5 ton. Incorporated in the truck are several units with which Motor Age readers are familiar and which are known to be standard in their lines. A Waukesha engine is used for the power plant. Esieman high tension magneto with an impulse starter is fitted for ignition. A Marvel carbureter with a superheater attachment, where the heat is applied from the exhaust pipe, is used for carburetion. The axle is Timken make. A one-piece housing is used and the axle is of the floating type. Timken roller bearings are used in both and rear and front axles. The clutch is a multiple disk type. The friction in the clutch is supplied by the contact of steel plates operating Raybestos covered disks. A cotta transmission is used and this mounted amidships. It has four forward speeds, reverse of course, and is fitted for a power tire pump drive and arranged for a power take-off drive. Blood Brothers universal joints are used

and these are covered with leather boots and packed in grease.

Several features on this truck are commendable from the standpoint of accessibilty. For example, the transmission may be removed without disturbing any of the units. The engine is fitted with large inspection and handhole plates, which makes it a get-at-able piece of machinery. Chassis lubrication on all the models is by the Alemite system.

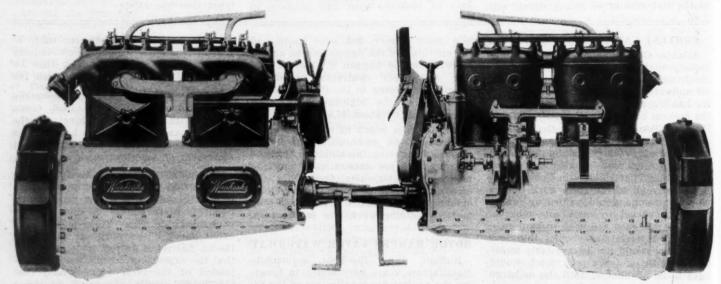
The powerplant is the new type Waukesha with chrome nickel heat treated steel crankshaft; aluminum, very deep section, crankcase; connecting rods, 35 carbon steel, heat treated, ground round to fit bearings; bearings, reinforced back with Fahrig metal lining; cylinders, split head design, best grade of gray iron bored and ground to size; lubrication, pressure feed to all main rod and piston pin bearings geared oil pumps, which supplies 8 lbs. pressure at 1000 r.p.m. The governor is of Waukesha design, adjustable to any speed, sealed and self lubricated, built integral with the engine, operating directly from timing gears.

Cooling is by fan and water pump. The radiator is of the built-up type with detachable finned tubes and the entire system can be drained from one point. Brief individual specifications of the

various models follows:

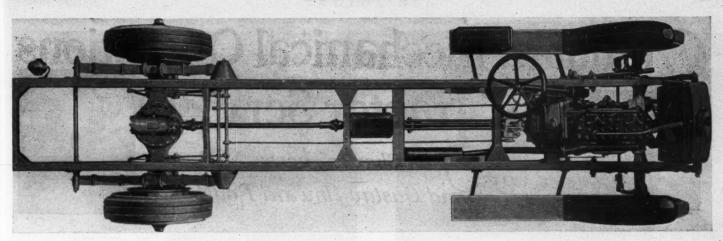
Five ton, 60 hp. Bore 5 in., stroke 61/4 in., crankshaft diameter 21/2 in. 16-plate clutch. Road speed 14 m.p.h.; low gear reduction 55 to 1 standard, 60 to 1 optional. Wheelbase regular 187 in., dump chassis 172 in. Loading space from back of seat to end of frame, regular chassis 13 ft. 6 in.; dump chassis 10 ft. 4 in. Brakes, duplex expanding on rear wheels 24 in. by 4 in. Frame pressed steel 9 in. section by 3 in. flange, in. material. Springs, semi-elliptic front and rear, front springs, 3 in. wide, 42 in. long, rear springs, 4 in. wide, 56 in. long; spring clips made from nickel steel. 24 gal. gasoline tank. Smith stee' wheels. Tires, regular equipment-solid tires 36x6 in. front, 40x6 in. dual or 40x12 in. Giant, rear. List price \$5850.

Three and one-half ton, 50 hp. Bore 4½ in., stroke 6¼ in. 16-plate clutch.



Carbureter and governor side of Waukesha engine used in new Acason

The water pump side of the Acason engine



Birdseye view of 31/2-ton Acason chassis

Road speed, 16 m.p.h.; low gear reduction, 46 to 1 standard, 55 to 1 optional. Wheelbase, regular 187 in., dump chassis 172 in. Loading space from back of seat to end of frame, regular chassis 12 ft. 10 in.; dump chassis 10 ft. 4 in. Brakes, duplex expanding on rear wheels, 21 in. by 3¾ in. Pressed steel frame, 7 in. section, 3 in. flange, 9/32 in. material. Springs, semi-elliptic front and rear, front springs 3 in. wide by 42 in. long; rear springs, 31/2 in. wide by 56 in. long. Spring clips made of nickel steel. 24 gal. gasoline tank. Smith steel wheels. Tires, regular equipment-solid tires 36x5 in. front, 40x5 in. dual or 40x10 in. Giant, rear. List price \$4900.

Two and one-half ton, 42 hp. Bore

4% in., stroke 51/4 in. 10-plate clutch. Road speed, 16 m.p.h. (same speed as the 31/2 ton, of particular interest to the experienced truck user); low gear reduction 45 to 1 standard, 50 to 1 optional. Wheelbase, 150 in. standard, 166 in. special length. Loading space from front back of seat to end of frame, standard, 10 ft. 8 in., special length, 12 ft. 10 in. Brakes, duplex expanding on rear wheels, 18 in. by 31/2 in. Pressed steel frame, 5% in. section, 21/2 in. flange, ¼ in. material. Springs, semielliptic front and rear; front springs 21/2 in. wide by 42 in. long; rear springs, 3 in. wide by 56 in. long. Spring clips made from nickel steel. 24 gal. gasoline tank. Smith steel wheels. Tires, regular equipment—solid tires 36x4 in. front; 36x8 in. rear, single or 4 in. duals. List price \$3850.

One and one-half ton, 38 hp. Bore 3½ in., stroke 5½ in., new type Waukesha motor, unit 4-speed transmission with 14-plate disk clutch. Road speed, 18 m.p.h., low gear reduction 42 to 1 standard. Engine, detachable head with pressure lubricating system; Alomite chassis lubrication. List price \$2650.

One ton, 38 hp. Bore 3% in., stroke 5½ in., unit 3-speed transmission with 10-plate disk clutch. Road speed, 20 m.p.h.; low gear reduction 34 to 1 standard, engine, with detachable head, with pressure lubricating system. List price \$2400.

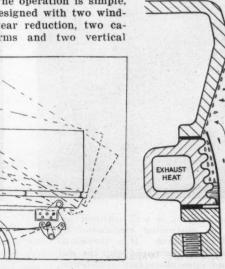
#### Saxon Duplex Manifold

The manifold employed on the new model Saxon is termed the "Duplex" manifold because of the dual function the design is claimed to perform. The illustration shows a section of the manifold at the throat, just above the carbureter flange. The construction is built around the theory that since the air has not changed it need not be heated, but inasmuch as the fuel has changed, some method is needed to vaporize it. The Saxon method is to catch the particles entrained on the wall surface and drain them back into a small reservoir around the throat. Here the exhaust heat boils the fuel and the volatile particles so produced emerge from the reservoir and mix with the lighter particle. Because of the very thin walls of the section surrounding the intake at the heated portion, the transfer of heat is very rapid and it takes only a short while for the fuel to reach its operating temperature. This manifold is now standard equipment on all Saxon models.

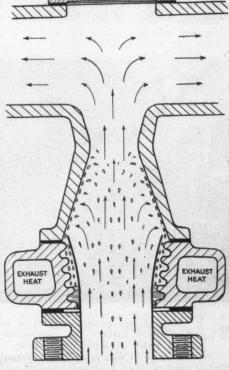
#### The Giant Easy Lift

The Giant easy lift hoist shown is manufactured by the Auto Truck Service Co., Inc., Milwaukee, Wis. It can be very easily installed on any truck or trailer without loosing space between seat and body. The operation is simple, the hoist being designed with two winding drums and gear reduction, two cables, two side-arms and two vertical

lift arms, which do the work. The operator can hold the load at any angle he may desire when raising or lowering it, by the operation of two hand levers, one to gage the clutch, and the brake lever to hold the load in position.



The Giant easy lift hoist can be installed on any truck



Saxon duplex manifold

# Standard Mechanical Operations in Tractor Service

by John Charles Thorpe, M.E. and Gustav Howard Radebaugh

EDITOR'S NOTE: The two pages herewith are the twentieth of a series covering the service operations on tractors, although the same can be applied quite generally to passenger car and truck engines. In the last article in MOTOR AGE we described the operations necessary to clear the water jackets of scale, iron-rust and other sediment. This installment involves the cleaning of the radiator. The views should be studied closely, and the tools used as shown. The operations are depicted in the approved

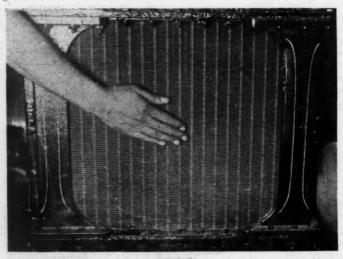
### PART XX-THE COOLING SYSTEM

How to Locate and Clear Obstructed
Circulation in Radiator

The same tendency to form scale in the water jackets, as previously described, is often the cause of obstructed circulation in the radiator. In order to provide as large a radiating surface as practicable, the water passages are

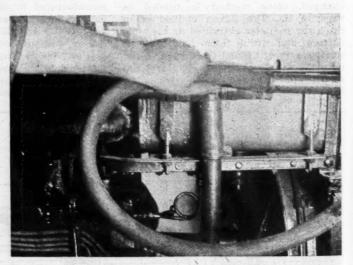
manner and should be followed to secure the best results.

quite small and thus the effect of rust, scale or sediment of any kind, is likely to be quite harmful. It is important, therefore, that the circulation through the radiator be kept perfectly free of any obstruction.

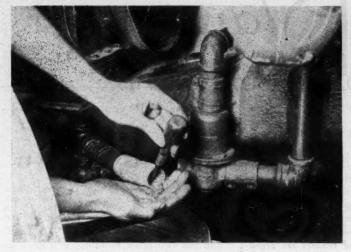


1. Having run engine until it is well warmed up, test radiator surface for obstructed circulation by holding palm of hand on surface. If a section is observed cold; that is cold, as compared with the rest of surface, cold spot indicates obstructed circulation.

Stop engine and drain cooling system



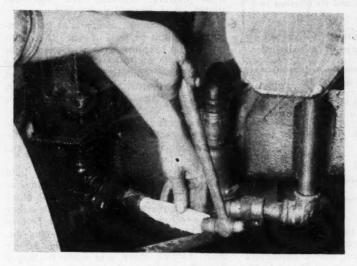
2. Disconnect hose connections, top and bottom, at ends farthest from radiator. Using hose from water system, as in previous operation, make connection through top hose and flush out radiator



3. Observe scale or sediment that appears in water flowing from lower hose connection. This is the material that has clogged the small passages in radiator, preventing proper heat radiation



5. Fill radiator with kerosene and allow to stand over night. The kerosene will have a tendency to cut the scale and so soften it that it may be fluched out as before



 Again disconnect hose and plug lower connection with wooden plug or corn cob



6. When the flushing has continued for some time, a surprising amount of sediment will be seen to come out with the water. This procedure is practically always effective. If it is not, it indicates that radiator has become so permanently clogged that a new core will probably be necessary for proper cooling

#### WHAT THE SERVICE DEPARTMENT EXPECTS OF AND OWES THE OWNER

(Concluded from page 15)

connection with the transaction mailed to the service department. This includes the owner's name and address, chassis number of truck, reason why parts were removed, length of time in service and in fact all necessary details so that the factory may promptly dispose of the affair.

Seventh: Complaints founded either on mechanical or shipping troubles must state all of the facts, as without full and complete information the service department is seriously handicapped in making an investigation, the lack of such information often involving a tedious search of record files, at a great expenditure of time and energy, also, frequently the necessity of asking for further details.

A careful appreciation of value of good

drivers or operators is highly desirable on the part of the truck owner.

The importance of good drivers cannot be overestimated. When operating only one or two trucks it is imperative that the driver be allowed time to properly lubricate the truck, during working hours if possible and if not, that he be paid for overtime spent in this way.

#### Doing Work at Night

With a fleet of trucks this problem is much simpler, as a man can be assigned to do the necessary lubricating, also replenish the fuel and water tanks, take care of the oil lamps or any other routine duties. At the same time, another man can attend to minor mechanical repairs and adjustments. This work could be accomplished at night and need not interfere with the daily work of the truck.

Many owners expect that if a driver works eight hours a day, the truck will be on the road for a corresponding period and this obliges the operator to make all replenishments of fuel or water and such little lubrication as the truck receives on his running time. This attitude encourages carelessness as obviously, if the owner is not sufficiently interested in his investment to conserve it, the driver likewise will not be much concerned and perhaps feel that those grease cups, those universal joints or the rear axle can go till next week or next month before he lubricates them.

Through long experience, the care of horses is thoroughly understood. The driver of a team feeds and waters them at definite intervals and no owner of a span of horses would hire a man who, through ignorance or negligence, was unwilling to give them this attention. It is just this sort of intelligent care which must be applied to the motor truck if it is to prove satisfactory, operating at a minimum cost with the least possible depreciation.

# Garage Dlanning Service Station Arrangements

No. 235

### TWO-STORY SERVICE STATION WITH RAMP

We are sending you a rough sketch of a proposed building to be located on a street corner facing 100 ft. on the main street and running back along the side treet 130 ft. Will you furnish us with a second showing how best to arrange the first and second floors, so that our business may be handled in the most economical way.

We expect to have a showroom for second-hand cars only, and a showroom for new cars, arranged on the first floor with a service station on this floor for taking care of very small jobs. We want the floor arranged so that cars can be driven in from the service station into the showroom for second-hand cars and into the showroom for new cars, so that all cars will enter the building through the service station. It is our intention to have every car and every employee, leaving the place, checked out so that we may know when each employee is gone, when he will return, and what car he is demonstrating, if any.

We, also, should like to include in the showroom for new cars, general offices, a private office for the president, an office for the secretary, a small waiting room, or rather a restroom where customers may wait while minor adjustments are being made on their cars, a salesroom, a lavatory and toilets.

On the second floor we want shop, shower baths, machine rooms, parts department, etc.

We sell about 250 new cars a year, and 200 used cars. Our parts department has from \$100,000 to \$125,000 parts. We work from twenty-five to thirty machines.—Fountain-Dunlap Auto Co., Macon, Ga.

Except for a few modifications we have followed your suggestions, only supplying the detail as to posts, and the proportions necessary to make it practical.

At the head of the stairway from the office, we have shown a small salesroom and counter. This would keep parts customers from wandering around the shop, interfering with work and making themselves nuisances generally.

The light shaft in the corner over the washrack is of doubtful value, but, as it uses space that is of no other use, there is no loss and there may be some gain. If you would insert some prism glass in the shaft at the second floor level, to diffuse the light, there might be some improvement; otherwise, most of the light will fall in the corner, directly under the shaft. Probably, you will need some artificial light; a good 75 or 100 wall lamp in a reflector, at each corner, will be better and more reliable than the light you could expect through the shaft.

We believe an elevator is a better

CONDUCTED BY TOM WILDER

.......

MOTOR AGE is receiving many inquiries for garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage and readers are urged in asking for such plans to be used to include the following information:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

proposition than a ramp for a service station. The realm of the ramp is the public storage garage, where customers are always in a hurry to get in and out. No. 236

### TWO LAYOUTS FOR 94 BY 300-FT.

Publish suggestions for two buildings, one 60 x 200 one-story, with basement, and the other 60 x 150 two-story, with basement. Want showroom for five cars, a good sized accessory room, stockroom, etc.

In the two-story building, will have an elevator, and in the one-story building, a ramp to the basement. Basement to be used for winter storage only.

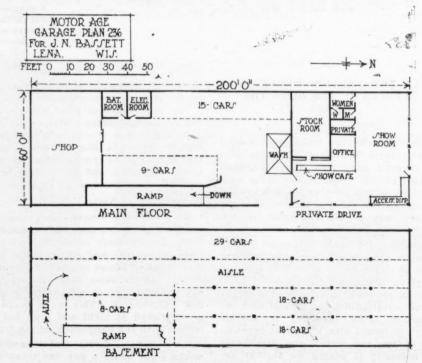
used for winter storage only.

It will be necessary to have a good sized repair shop for about four men, with battery, welding and electrical rooms. B. J. Bassett, Lena, Wis.

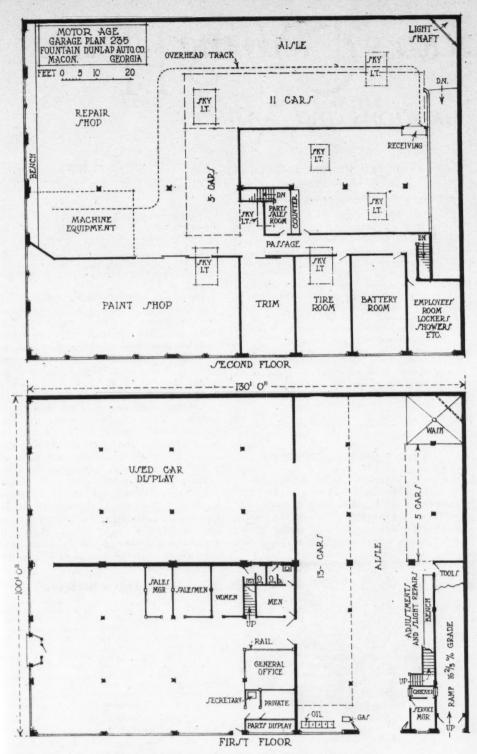
With the amount of space at your disposal it might be well to place the building at the extreme west portion of your lot. Also, it would be well to extend the front of the building to within ten feet of the east line, giving an increased frontage for the display of cars and accessories.

This arrangement would give a large yard for outdoor work in good weather, yet be concealed from the street by the extended front.

We recommend the two-story and basement building as the best, in our estimation; but would prefer a one-story building covering the whole lot, to either of the other arrangements and believe it could be built and operated cheaper. It would be 1,200 sq. ft. of floor larger than the two story, and 4,200 ft. larger than the one-story building.



No. 236-Two layouts for 94 by 300 ft. lot



No. 235-Two-story service station with ramp

#### Wonderful Times Ahead

(Continued from page 8)

other words, about 15 per cent of the people in the country are going to the city. How does that leave the country? In New York state, this year, 25,000 farms will be abandoned. It is estimated that 20,000 more will be abandoned next year. We are not going to see eggs for ten cents a dozen again. Eighty per cent of the farm labor in New York state is above fifty years of age. So, if you have anything that has to do with labor-saving machinery on the farm, it is impossible to produce enough of it.

"Now about these problems we have ahead of us, and the ones we are working on. There used to be a lot of debates as to which was the mightier, the pen or the sword. If you will follow that through, you will find neither had very much to do with the progress of the world. It has been man's ability to utilize power, exterior to himself, which has been the greatest contributing factor in the progress of the world. This is shown in our transportation systems, machine shops, mechanical devices of all

kinds. We have utilized them for the good of the human race. This is the great maker of civilization. With the advent of the automobile, came the first time when, in the history of civilization, man had a transportation device which was entirely within his control.

"When the European situation is studied, it is found the great difficulty is lack of power. Coal is their great need. Not from the heating standpoint but because of the power it represents. In Italy, last fall, coal was selling for \$125 a ton. I have just received a letter from a correspondent in Paris, telling me they are back on a war basis so far as coal is concerned. The various industries have to work certain hours. Some work during the day, others at night. They have a certain amount of coal allotted to them, and must fire their boilers in the most economical way.

#### Fuel Our Greatest Problem

"We have never had to face such a situation in this country. Last fall we had a coal shortage for the first time because of the strike. But to-day, America's greatest engineering problem is the question of fuel, and it will continue to be the greatest problem for a number of years to come.

"Gasoline is twenty-nine cents a gallon to-day. That is not as high as it will go. Why is that true? To-day we have about 6,500,000 automotive vehicles in the country. They consume 15,000,000 gallons of gasoline per day. This year alone, we will produce about 2,500,000 cars. The demand for gasoline will increase in proportion to the increase in cars. This means that the price of gasoline will go up. Other commodities are going up for the same reasons.

"Now gasoline is produced from fuel oil. What is fuel oil? Geologists tell us our great coal and oil regions were covered with a tremendously heavy vegetation and as they were slowly covered up by nature, great coal beds were formed. Big pools of fuel oil were also formed. We might say the fuel supply is just a bank account stored up for us by the sun.

"Never anything has moved, or will move, which has not been moved by the sun. Gasoline is simply liquefied sunshine. Quite a lot of people talk of alcohol as a fuel. Whenever the price of gasoline gets up around two dollars a gallon, we can begin to consider alcohol as a fuel.

"Suppose we produce alcohol from corn. We can plant a seed of corn here and in ninety days have a mature corn plant which will weigh roughly 2500 times as much as the original seed. We can dry and burn it and get back a lot of heat. Remaining we have five per cent in ash. Place this residue in the pot, plant another seed and in ninety days there will be another stalk. Now what made it grow? Nothing but the physical solar energy of the sun. If you took that stalk and liquefied it, you could get some alcohol, and it would

(Concluded on page 52)

# Plearing Louse uestions and Answers

#### OVERCHARGING BATTERY

-Is there any provision made in a Westinghouse two unit starting and lighting system to prevent an overcharged battery when a car is run say 40 to 50 miles a day with few stops and not used

2-Could a fuse block be placed between the ammeter and battery in the generator circuit to take care of it?

3—Would the lights burn as long as

engine was running after fus blown?—W. H. Keller, Tallula, Ill. fuse

1-There is no provision made to prevent over charging of the battery. If the car is being driven constantly every day without any night driving the thing to do is to drive with the lights lit in the daytime and reduce the charging rate of the generator. In the summer this overcharging is much in evidence and as a rule the battery heats up extensively.

2-We do not believe it is advisable to do this as the fuse would have to be strong enough to carry the generator current or the battery would not receive any charge at all. If this factor was a great disadvantage to the operation of a starting, lighting and ignition system the designers would have provided a means of overcoming the difficulty.

3-When the engine is running fast enough to give a certain generator speed the lights are furnished with current from the generator and if you will watch the ammeter when all the lights are lit and the car is running you will see that it takes considerable speed before the ammeter will show a charge that is being sent to the battery. If the generator is forced to furnish the lighting without any connection with the battery at all it will prove very dissatisfactory.

#### FORD GENERATOR ARMATURE

Q—Should a test light or a volt meter be used to test Ford armature using a 110 A. C. current? 2—What is correct voltage for test

light or volt meter?
3—Is an armature which attracts metal

4—Where can book on armature winding for motors and generators be ob-

tained. 5—Publish internal winding diagram for Ford motor and generator armature. —M. Botkin, Battery, Magneto & Radiator Exchange, Richmond, Ind.

1-Either one may be used but the voltmeter is more accurate.

2-With a test light it is impossible to tell what voltage is flowing through the lamp without a voltmeter. If the generator has been water soaked a leakage of current is liable to occur. In some cases this may be detected by a test lamp, placing one terminal on a commutator segment and the other upon the shaft or lamination of the armature as shown in Fig. 1. A ground will cause CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age 

THIS Department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by some one else and these are answered reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

#### The Electric System

<u>-</u>

the lamp to burn brightly; a slight leak will allow the lamp to glow; if the light does not light at all there is probably no leakage between the coils and the shaft, indicating that any trouble in the armature is not caused by a ground. More

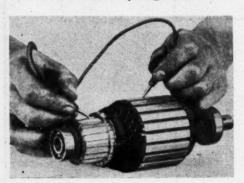


Fig. !. Method of testing armatures for grounds

details on armature testing were published in May 6 issue of Motor Age.

3-We advise taking the subject up with the McGraw Hill Publishing Co., N. Y., and the A. C. McClure Co., N. Y.

4-We have no diagrams in our file which show the internal wiring of the armature itself but Fig. 2 shows a phantom view of the whole generator assembly. You may be able to obtain the diagram which shows the generator armature winding in detail by writing to the Ford Motor Co., Detroit, Michigan.

#### BATTERY RUNS DOWN

Q—A 1917 8-cylinder Model 70T Murray touring car No. 633 is equipped with Westinghouse starting and lighting sys-tem, Dixie 86 magneto and a new Co-

lumbia battery. When the car is driven lumbia battery. When the car is driven about twenty miles the ammeter registers 15 amperes, when running 15 m. p. h., 10 amperes are charging. It does not go above 15 amperes. There do not seem to be any short circuits. When left standing all night the better is dead the approximation. ing all night the battery is dead the next morning. Driving the car again will charge battery sufficiently to light head-lights brightly at night. Could it be pos-sible that the wrong post of the battery is grounded?—Philip Baker, Blairsville,

Yes, there is a possibility that the battery may be in the reverse direction, however, this does not seem to be the most plausible reason. It seems to us that the most possible reason is that the generator cut-out is not functioning quite as it should. Observe the ammeter when the engine is shut off. Does it show a discharge? If it does it is an indication that the cut-out points are sticking allowing the battery to discharge back through the generator. If no discharge current shows on the ammeter when the engine is shut off after a period of running, then break the connection of the battery connection and see if there is a spark at the terminal when this contact is broken, if it is, there is an indication that the lines from the battery to the starting switch is grounded at some point between, and this will have to be traced out to be determined exactly.

#### INSTALLING IGNITION

Q—Desire to install another set of spark plugs in place of priming cocks connecting these plugs up with the battery ignition on a 1920 Roamer equipped with a Continental engine and magneto ignition. Understand that the engine block is already drilled to install Delco ignition. If this is feasible what Delco parts are necessary to make the change? At what point on the engine would the distributor be connected? Publish diagram.—E. P. Lightcap, Birmingham, Ala.

We have no information on this particular feature of construction. This is a problem that should be taken up with the Roamer Co. and also the Dayton Engineering Laboratories. If this is feasible and an easy installation these companies will be able to furnish very complete details as to how it should be done.

#### REO WIRING

Q-Publish wiring diagram of the 1914 Reo Four car.—Lawrence A. Caldarello. K. C., Mo.

Wiring diagram of the 1914 Reo fourcylinder model appeared in the April 8 issue of Motor Age.

#### BOSCH INSTALLATION

Q-Instruct how to install a Bosch DU4 high tension magneto on a 1917 Dodge. Jesse Kritzer, Indiana, Pa.

The Bosch company has a set of standard installations for use on all makes of cars and they are in a position to furnish all the necessary detailed information on the installation of their prod-

#### SPARKING AT BRUSHES

Q-Should the generator spark at the brushes?-Lincoln Olson, Carney, Mich.

If there is excessive sparking at the brushes you can be pretty sure that the brush contact is poor. This may be due to a weak brush spring or to badly worn brushes and a dirty commutator. If there is excessive vibration sparking may also result. It has been found that where the generator is used as a starting motor sparking will develop in time, due to the arcing of the heavy starting current at the trailing edges of the brushes. This trouble can be remedied by filing the brushes down.

#### BACK-FIRING IN MUFFLER

Q—We have an American-Le France six cylinder fire apparatus which has been giving us trouble from time to time as follows: The engine at idling and intermediate speed runs fine but on high speed commences to spit through the exhaust. We have checked up on the carbureter and ignition, valves and valve timing thoroughly and everything appears to be in proper shape and place. Would you advise what the trouble can be in this case?—Paul A. White, Army Supply Base, Norfolk, Va.

We are inclined to believe that the trouble is due to faulty ignition even though you have checked it carefully. Back-firing through the muffler usually occurs as a result of a charge being drawn into the muffler which has not been fired and when the spark is thrown on suddenly the charge is ignited. This may be caused by the failure of one of the spark plugs. If one plug is missing explosive charges will be pumped into the muffler and it is ignited from the heat of the next exhaust change.

#### PAIGE WIRING DIAGRAM

Q-Publish wiring diagram of a 1913-1914 Paige-Detroit roadster.—W. H. Hunt, First Heavy Mobile Repair Shop, Camp Mead, Md.

See Fig. 3.

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#### DELCO MOTOR GENERATOR ACTION

Editor Motor Age: In the issue of May 27, in reply to inquiry of The Hildebrand Motor Co., one factor that might have caused the trouble was not mentioned. When ignition is turned on current is also sent through the generator windings causing armature to rotate slowly for meshing starting genrs. When starter is depressed, motor liush is lowered onto its commutator while generator brush should lift. Failure of generator brush to lift will cause a discharge of about 250 amperes instead of the usual 150. By removing the front cover they can readily see the difficulty.—N. E. Nelson, Marysville, Wash. see the diffi

Editor's Note: The above mentioned action should always take place with the Delco system and it would be well to carry out the inspection by removing the front cover as directed.

#### HEADLIGHTS ON FORD MAGNETO

Q-Is it possible to attach electric light to a 1914 Ford equipped with its original magneto? Will it cause trouble other than to lessen the amount of current for tignition while the lights are turned on? Some claim it will ruin the magneto Is this true?—John H. Meyer, Crivitz, Wis. To assist readers in obtaining as a unit I all information on a certain subject MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

THE ELECTRIC SYSTEM

E. P. Lighteap......Birmingham, Ala. Lawrence A. Caldarello Kansas City, Mo.
C. E. Fields San Francisco, Calif.
Lincoln Olson Carney, Mich. Paul A. White, Army Supply Base.

Marysville, Wash. N. E. Nelson.... 

Frank Stephanski......Grand Rapids, Mich. THE POWER PLANT

Arthur J. Bonninghausen..... Detroit Cortez, Fla. .... Hartford, Conn. T. E. Gough..... .....Rush Center, Kans. Homer Strosnider.....Clarksburg, W. Va. C. F. Bliss ......Cordon, Ohio Auto Salvage & Parts Co.

Oklahoma City, Okla.
L. E. Hoskins......Lockwood, Ohio MISCELLANEOUS

H. Engbertson, Jr......Decorah, Ia. F. W. Lange, Atwood Garage....Owen, Wis.

CARBURETION Ross H. Bell Buckingham,
R. E. Clawson, General Auto Repairing ..Buckingham, Ia. Springfield, Ill.

While it is true that the generator must supply a larger amount of current when headlights are hooked up to the magneto system, there will be no injury resulting to the magneto from this practice. If too large bulbs are used there is a possibility that the magneto will be de-energized too rapidly, and in this case the magnets must again be charged, but this is a simple matter when the method is employed that has been described from time to time to Motor Age.

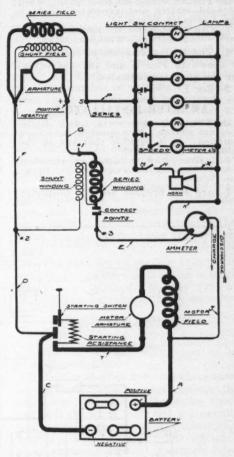


Fig. 3. Gray & Davis system used on the 1914 Paige model 4-36

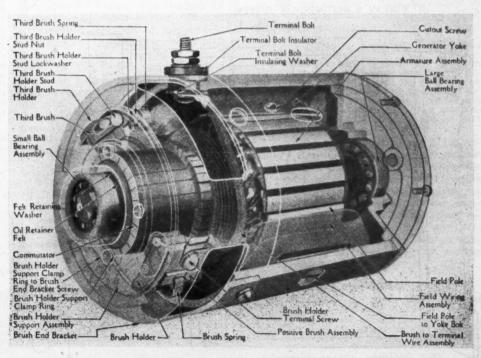


Fig. 2. Phantom view of the Ford generator armature

#### PULLMAN DIAGRAM

ear model E. M. C. No. 4842.—Wm. Nacol, Mgr., Service Garage, Eunice, La.

Wiring diagram of the Apelco system on a 1916 Pullman model of which EMC 4892 is one is shown in Fig. 5.

#### AMMETER INSTALLATION

Q-Publish wiring diagram of the Ward Leonard starter and generator used on the 4-cylinder Saxon 14.

2—Can an ammeter be installed on this car?—W. S. Jerman, Wheaton, Md.

1-The wiring diagram of this system is shown in Fig. 7, and the connection for the ammeter indicated.

2-See 1.

TAIL LIGHT

#### AMMETER INSTALLATION

Q—The generator on a Buick B 25, does not charge. New brushes have been installed. Is it possible that one of the fields are burned out?

2—Instruct how to install an ammeter.

—A. F. Hanson, Bellevue Garage, Bellevue, Wash.

1-Are the brushes seating properly?

AMMETER .

LIGHTING SWITCH

DASH LAMP

BATTERY

STARTING

BODY)

1917 MURRAY 8. WESTINGHOUSE SYSTEM

COUPLING

COUPLING BOX

Make a test to see if the brushes are grounded with brush holder and frame. The commutator may be dirty or out of round or the mica of the commutator may be high.

2-Referring to Fig. 6 it will be noted that a brass strap connects the two terminals 1 and 2. On some of the machines this strap is inside of the frame as indicated by the letter B and in others on the outside as in A. If this strap is on the inside of the motor generator it will be necessary to remove the motor generator from the car and take it apart to cut the strap. Where the strap is on the outside as in A, it can be cut with a hack saw without removing the motor generator from the car. After the strap is cut, one terminal of the ammeter should be connected to each of the two terminals; the other connected to the switch and storage battery respectively, but left just as before. For such an installation the Delco company recommends the use of a dead beat type, hav-

> HEAD LIGHT

HEAD

LIGHT

GENERATOR

MAGNETO

IGNITION SW.

STARTING

MOTOR

3 HORN STEERING GEAR WIRE

REGULATOR

ing a zero center and approximately 30 amperes charge and discharge range. The meter connected in this way will indicate the net charging current, but will not indicate the discharge current taken by the motor during the cranking operation.

#### MURRAY WIRING

Q—Publish wiring diagram of a 1917 eight-cylinder Murray car, model 70T, No. 633, equipped with Westinghouse starting and lighting system and Dixie 86 magneto.—Philip Baker, Blairsville,

This diagram is shown in Fig. 4.

#### COIL BOX BURNS OUT

Q-What causes the coil box on a 1917 Studebaker to burn out?-Frank Stephan-ski, Grand Rapids, Mich.

This is a question that cannot be answered, for so far the engineers have not attributed the burning out of coils to any particular cause.

#### Engines

#### USE OF GASKETS

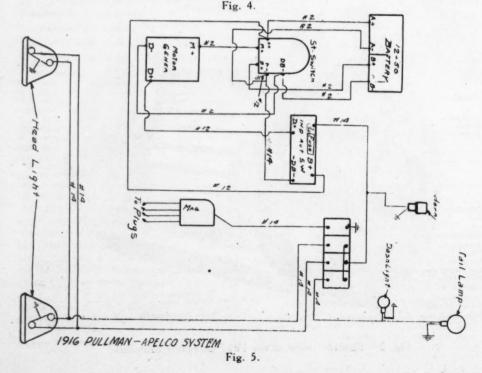
Q-Would there be any advantage in Q-Would there be any advantage in using two extra cylinder head gaskets on a Ford car in connection with a superheated manifold? What would be the effect of this installation on power, speed and gasoline economy?—Arthur J. Bonninghausen, Detroit.

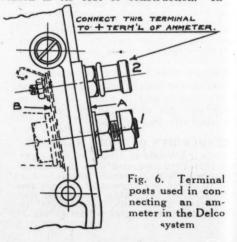
There would be one effect from using 2-cylinder head gaskets on the Ford engine in connection with a superheated manifold. This would be that the tendency toward engine knocking would be greatly reduced when heavy fuel is used. As regards the effect upon power, the engine will produce less with the gaskets than without, because the compression pressure will naturally be less. Speed and gasoline economy will not be noticeably changed.

#### OVERHEAD CAMSHAFTS

Q—Why doesn't some American car manufacturer bring out a car with an engine along the lines of the new Hispano-Suiza, that is, overhead valves and overhead camshaft, cams operating directly on valve-stems with no parts between? Has any American car manufacturers experimented with this type of engine with a view to regular production. All other things being equal, will not this type of engine deliver more horsepower than one of same size but with pushrods and overhead rocker arms?—P. H. Guilfoil, Hartford, Conn.

This is of course a question we cannot answer fully. Perhaps the primary reason is its cost of construction. In





the higher class European cars using the overhead valve construction overhead camshafts are used exclusively. So far as we know there is no American car manufacturer that has revealed any intention of building an engine of this type for regular production. There are a great many things that have a direct bearing on the possible power that an engine will develop. If you will glance over the specifications of the racing cars that were built for the Indianapolis race you will find points of design that have enabled the engineers to get engines that would develop over 100 hp. with a very small displacement.

#### STEVENS DURYEA ENGINE

Q—What is the brake horse power of the 6-cylinder engine used in the Stevens Duryea car which is a 1917 or 1918 model. At what speed is engine rated?—W. A. Read, Cortez, Fla.

Our records show that the Stevens Duryea car has been out of production since 1915 and that they are now ready to place a new car on the market. We have no information as to what speed this engine runs or what maximum hp. it develops but the N. A. C. C. rating is about 47 hp.

#### CYLINDER WEAR

Q—The cylinders on a Chalmers 6-30 have worn .003 to .004 egg shaped and .006 larger at the top. What causes this excess wear? Would longer pistons be better? It seems to me that these short alloy pistons have a tendency to tip and bind when the explosion takes place.—T. E. Gough, Rush Center, Kans.

It is a very hard matter to state just what causes the wear in this particular part of the cylinder. In the first place the average American engine is turned out today without any ageing of the cast-It has been shown many times ings. that after taking particular pains to get fine and accurate machine work that after the engine is assembled and run that it is found all out of shape, so to speak, after the engine is heated up, Wear must take place to a certain degree and it may be that this excessive wear is due entirely to the material used in the cylinder block or the particular way in which the engine was assembled. It may also be due to some extent to the proportionment of piston area or bearing surface above and below the wrist It is evident that there is considerable more surface below than above the pin in this particular piston. You may be able to correct the wear in some degree by the use of a piston that has a greater area above the pin. During the war the government carried out some very interesting experiments on some of the trucks that were in use on the border with regard to carbon deposit and wear of engine parts. It was found that approximately 65 per cent of the carbon deposit was caused by common ordinary road dirt and not by the oil as was generally believed. It was found that the dirt was drawn in with the charge and naturally picked up by the oil and held in the engine. This dirt not only formed carbon but acted as a grinding compound as well and the result was very excessive cylinder and piston wear.

#### ENGINE DESIGNS

Q-Under the latest engineering practice which engine is better balanced, the four or six cylinder?

2-Which engine has the more endurance, the four or the six?

3—Which engine's crankshaft is the speedier, the four or the six? May the four cylinder engine have speed as high as 4000 r.p.m.?

4—With both engines having the same crankshaft speed, which will have the more endurance, the one with low gear ratio or the one with high gear ratio?

5-Why do most of the engines built for racing have only four cylinders?

6—Which is the better cooling system, thermo syphon or pump?—Homer Strosnider, Clarksburg, W. Va.

1—As far as balance is concerned it is very difficult to state which type is the better balanced. The question hinges on your opinion of the definition of the word balance. To the writer's mind both types may be equally well balanced and yet the vibration of the four cylinder engine will be greater than that of the six.

2-The question of endurance is not dependent to any great extent on the type of engine or the number of cylinders used but rather upon the quality of materials and workmanship. Durability is largely a question of the details of construction. In Europe, every car is given a road test before it is delivered. Some of the higher priced cars are driven as high as 10,000 miles and then torn down and factory rebuilt before being sold. In addition to this all of the castings are aged. In one particular European design, the crankshaft weighs 770 lbs in the rough form and only 99 lbs. when finished. This means that

when the job is turned out it should not be necessary to touch it for, say, 100,000 miles and we have reports of cars that have been driven this far without any adjustments other than minor adjustments.

3—The crankshaft speed is entirely dependent upon the engine design. There are some of the four cylinder engines being built today that are running over 3,000 r.p.m. and there is no reason why one cannot be designed to run 4,000.

4—The Indianapolis race is one of the best endurance tests that has ever been run. Cars having engines of various types and number of cylinder have competed and of course some have made a better showing than others. In order to produce a durable design the car must be built to meet with the conditions under which it run and it is necessary to consider every feature of the entire car design.

5—So far the greatest number of racing engines have been four cylinder engines but at the present time there seems to be a decided trend toward the use of engines having eight cylinders in a row.

6—The question of cooling systems is open to discussion and there is a large variation of opinion. At the present time the pump system is in the majority.

### GASOLINE CONSUMPTION

Q-Will a 40 h.p. 4-cylinder engine use less gasoline than a 40 h.p. 8-cylinder will use pulling the same load?—C. F. Bliss, Cordon, Ohio.

• If the two engines have the same number of cubic inches displacement, the same size valves, run the same speed and pull the same load, and are equally well adjusted the gasoline consumption will be about the same. The efficiency of an engine is dependent entirely upon design and workmanship. In figuring the efficiency of the engine with respect to the car or truck it is necessary to give careful consideration to the method and efficiency of transmitting the power.

### CLEANING SALVAGED PARTS

Q—What is the best method of cleaning used parts before placing in stock? We have been using a low grade of kerosene denominated "Solar Oil" by the refineries. This does fairly well but still leaves the parts in such condition that they are disagreeable to handle.—Auto Salvage and Parts Co., Oklahoma City, Okla.

The field pieces used in the Field Artillery were cleaned with a hot solution of sal soda and then dried thoroughly. It would be a very good idea to apply this system to the salvaged parts. A large vat could be built and the parts thrown into this hot solution, then removed and dried. If the parts are to be stored away it is a good idea to give them a thin coating of oil to prevent rust.

### MITCHELL POWER CURVE

Q-Publish power curve of the Mitchell.

2—What would be a good speed for a Mitchell in good order, on a brick road?
3—Where can a radiator shutter for this car be secured?—L.E. Hoskins, Lockwood, Ohio.

1-Power curve shown in Fig. 11.

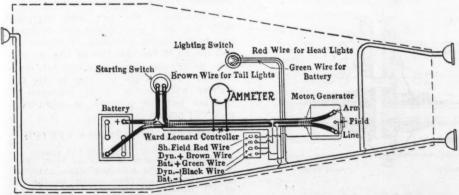


Fig. 7. Saxon wiring diagram with ammeter connections indicated

2—This car ought to make about 60 miles per hour under average conditions. We are not in a position to make any accurate statements about the possible speed of any car as there are so many factors which alter the case.

3—A radiator shutter may be obtained from the following companies: Auto Metal Parts Co., 624 Michigan Ave., Chicago, Pines Mfg. Co., 408 N. Sacramento Blvd., Chicago.

#### RACE DISPLACEMENT LIMIT

Q-What A.A.A. races are strictly 183 cu. in. piston displacement limit? Is the 500 miles at Indianapolis limited to 183 cu. in.?—Grover Horn, Wauwatosa, Wis.

The engine size is specified by the track officials. So far the only race that has been run in which 183 cu. in. displacement was specified, was the In-

dianapolis race of May 31. In all probabilities the majority of races that will be run this year will be limited to cars having 183 cu. in. displacement.

#### ENGINE AND CAR SPEEDS

Q—How many revolutions per minute will the engine of a Chevrolet 490 make when the car speed is 10 m.p.h. on high?
2—How many revolutions per minute will the engine of a Ford make when the car speed is 10 m.p.h. on high?—W. B. Kinn, Effington Automobile Co., New Effington, S. D.

1—At a speed of 10 m.p.h. the engine speed is 475 r.p.m.

2-408. These speeds can be figured by the following formula:

m.p.h. x gear ratio

wheel diameter in in.

gives engine r.p.m.

337

### Miscellaneous

#### OIL LEAKS TO CLUTCH

Q-What makes a 1917 Maxwell leak oil to the clutch so that it has to be drained out every few weeks?-W. S. Jerman, Wheaton, Md.

This is evidently caused by a loose rear bearing which permits the oil to flow into the clutch housing. The clutch that is used is of the cone type with a fabric facing running in an oil bath but it is evident that the excess oil is coming from the engine. It would also be advisable to examine the oil retainer between the clutch and the transmission for this may also be the source of part of your trouble.

### REPLACING STUDEBAKER GEARS

Editor Motor Age—In the April 22 issue of Motor Age you published an article demonstrating the way to replace worn gears in the transmission of a Series 17, Studebaker in which you recommend removing the transmission case itself an operation which is unnecessary and a long way around. It is much quicker to leave brake rods, torque arm, and transmission case assembled and just drop the drive shaft. Take the bolts out of the transmission end plate and pull out the entire transmission assembly less the spline shaft and reverse idler. Put on the new gears and assemble as follows: Place counter shaft in its proper bushing in the end plate. Place the two sliding gears in their shifting fingers and then engage the gears in high, which will hold that one gear in position and the low and reverse gear can easily be reached to place it on the spline shaft properly while the entire assembly is put in position. The countershaft and the

spline shaft can be easily entered in their separate places as it is pushed in bolt up the end plate, assemble the drive shaft and the job is completed. To give an idea of the time it saves: All new gears can be put in and the transmission replaced and the job completed in one and one-half hours. Whereas it will take the best man at least 3½ to 4 hrs. to do it as you suggest. In my shop I allow 1½ hrs. to replace any one or all of the transmission gears in the Studebakers from series 15 to 18 inclusively.—L. A. Neeley, Mgr., Boyd St., Garage, Los Angeles, Calif.

Here is a very good way to remove and replace the worn gears in the transmission of a Studebaker. The method described in MOTOR AGE recently is certainly not as good as this method, if it

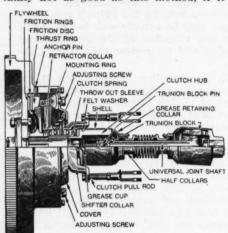


Fig. 10. Mitchell clutch and universal joint assembly

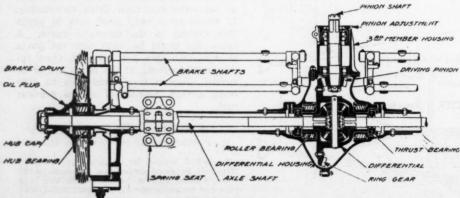


Fig. 9. Cross sectional view of Oakland rear axle and differential

takes longer to perform the operation as Mr. Neeley describes.

### STRENGTH OF WELDING

Q—Will an axle shaft or propeller shaft welded by oxy-acetylene hold satisfactorily under normal working conditions?—Moulton Motor Co., Casper, Wyoming.

Companies doing this kind of work claim that the weld is even stronger than the original and we have known cases where a shaft has been welded and broken again, the break occurring at a point some distance from the weld. There is no reason why the shaft should not stand up under normal working conditions if the job is properly done.

### HEAVIER OIL IN WINTER .

Q—Could Mobile B, a heavy oil, be used to better advantage on a Ford. Now use Gulf medium oil and have so much carbon trouble and the engine gets very hot in summer time.—E. J. Blocher, Louisville, Ky.

It is always advisable to use a heavier oil in the summer time as the engine works at a much higher temperature and the oil will thin out. Lubrication is a very important factor in the efficiency of the engine and particular attention should be paid to see that the oil is changed at frequent intervals. In most cases oil changing is neglected and the car is allowed to run as long as it will by just adding to the supply of oil. No matter how accurate the machine work is or how well the pistons are fitted there is a certain amount of gasoline that will get by the pistons and get into the crank case. This destroys the lubricating properties of the oil very rapidly and therefore it is correct practice to change the oil very often. The carbon trouble is more apt to be a result of too rich a mixture than it is of too much lubricating oil.

#### USING OVERSIZE TIRES

Q-What speed is the Overland 4 capable of? My car has attained a speed of 57 miles per hour.

2—Publish power curve of the Overland engine. Also what is the r.p.m. of engine?

3—Would 31x4 tires on an Overland 4 be best on rear wheels and would extra pull make much difference in pulling power?—A. E. Hampton, Pittstown, N. J.

1—We believe you have reached about the maximum speed of this car.

2—This engine develops about 27 hp. but we do not know the speed at which maximum hp. is delivered and it is impossible to give the power curve.

3—Equipping the car with oversize tires will give you better tire mileage and better riding qualities. However, if you intend to use this size of tire we advise using the same size on all four wheels. This slight increase in tire diameter will give a slight increase in traction but the amount of additional pull will not be noticeable.

### ADJUSTING HUPMOBILE CLUTCH

Q—Instruct how to adjust the clutch on a Hupmobile Model H. R. year 1913. The clutch cannot be released when shifting gears. Sometimes they cannot be shifted at all, making it necessary to stop the car to do so. The clutch is so difficult to depress that it takes all the strength that can be mastered to do so. It seems to act like a brake on the engine. There is a large burr or adjusting boilt to regulate the clutch. Which way should this be turned?—H. Engbertson, Jr., Decorah, Iowa.

The clutch is of the multiple disk type and runs in a bath of oil. The spring tension is readily adjustable by removing the transmission cover and screwing up the nuts A in Fig. 13 until the necessary tension is obtained. These nuts lock by spring tension every onethird turn. Be sure to screw each nut the same number of turns, so as to get the same compression on all springs. To insure smooth meshing and make gear shifting easy the clutch is equipped with a brake, which acts automatically when the driver disengages the clutch and pushes the pedal a little beyond where the clutch is free. Referring to Fig. 13 in order to adjust the clutch brake, which is necessary if the clutch brake F does not make contact with the clutch follower plate bearing E when the clutch pedal is fully depressed, move the adjusting nut G in a counter-clockwise direction as indicated by the arrow, until a contract is obtained between the brake F and the plate E.

#### CLUTCH TROUBLE

Q—Recently I met the owner of a 1920 Mitchell equipped with a Borg and Beck clutch which stuck, the man says. When he drove the car in the shed last fall it worked good, and upon taking it out this spring the clutch failed to release. The transmission was set in gear and the brakes set. We tried to turn the engine to see if it would loosen. The adjustment was also altered but it didn't help any. All the bolts were loosened at the back of the clutch, thinking that this would help but it didn't.—F. W. Lange, Atwood Garage, Owen, Wis.

When the clutch pedal is pushed down, the clutch spring is compressed relieving the pressure against the rings and permitting them to slip, thus breaking the connection between the engine and transmission. The first thing to do is to see if this spring compresses when the pedal is pushed down: If so it may be that the friction disks are frozen or Loosen the two adjusting dragging. screws in the slotted holes in the cover plate. Depress the clutch pedal and push these screws in a counter clockwise direction, Fig. 10. If after these tests and adjustments the clutch still fails to release you will probably have to take it down. In removing the clutch and universal joint proceed as follows: disconnect the front universal joint member by compressing the grease retaining collar spring, taking out half shells and sliding back the cuff or housing. Slide the spring, rear grease retaining collar and cuff forward on the universal joint shaft and remove the whole universal joint assembly. Disconnect the clutch pull rods by removing the clevis pins. Place two wood blocks 1% in. thick between the clutch cover and the ends of the clutch pull rods, thus relieving the cover of spring pressure when the twelve cap screws holding the cover to the flywheel are next removed. Remove

the nut holding the clutch hub on the crankshaft when the whole clutch assembly can be slipped off the end of the crankshaft, the friction rings and the disk remaining in the flywheel. To remove the friction disks, drive in the three anchor pins and the rings can be readily removed. With the clutch removed from the car it can be disassembled. Exert pressure on the retractor collar and remove the locking wire and blocks from the flange nut. Unscrew this nut, left hand thread, and the whole clutch can be disassembled as the pressure on the collar is released.

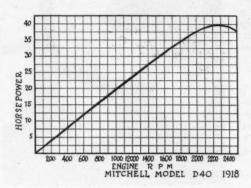
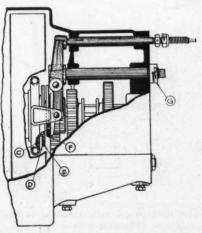


Fig. 11. Mitchell power curve



Fig. 12. Rayfield carbureter with adjustments indicated





### Carburetion

#### RAYFIELD ADJUSTMENT

Q—Give the adjustment of the Rayfield carbureter used on the Saxon Six, 1917.—Ross H. Bell, Buckingham, Iowa.

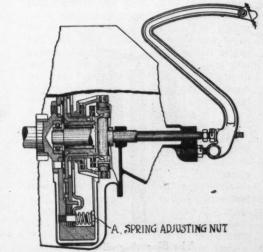
To adjust the Model M. Rayfield carbureter used on this car proceed as follows: There are three adjustments on this carbureter, which is illustrated in Fig. 12, although two of them only serve to increase or decrease the density of the mixture. The low speed adjustment should be set first. To do this, turn the spark and shut the throttle down so the engine idles nicely after making sure that it has run sufficiently long to thoroughly heat all parts. The low speed adjustment should be turned until the engine slows down perceptibly, and until the exhaust fumes lose the heavy pungent odor characteristic of gasoline burned with an insufficient amount of air. Then turn this adjustment to the right until the engine speeds up slightly. If at this setting the engine does not turn over slow enough with the gasoline and spark levers set at their reduced position, use a small screwdriver, and turn the screw A to the left, which will allow the butterfly valve to close tighter.

Now advance the spark about twothirds of the way. Then grasp the throttle connection to the carbureter and open the throttle valve very suddenly. If the engine sputters and coughs as it accelerates, then it is a sign that the high speed nozzle is under supplied. Turn the screw to the right, which will increase the amount of fuel fed to this nozzle. This screw is just inside the air intake opening. It is possible that you will find this screw soldered tight, because the factory deemed the high speed adjustment sufficient to take care of all ordinary conditions.

#### SCHEBLER ADJUSTMENT

Q-Publish adjustment of the Model R. Schebler carbureter.—R. E. Clawson, General Auto Repairing, Springfield, Ill.

The adjustment of the Model R Schebler carbureter is given on page forty-five of the May 20 issue of Motor Age.



# The Accessory Show Case New Fitments for the Car

### B-R Match Box Holder

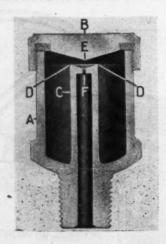
A very interesting accessory which will prove beneficial to the service station by giving it advertising, is the match box holder shown in the illustration, which can be attached to any steering wheel. It can be attached in just a moment by simply slipping the clamp around the spoke and adjusting a bolt. It is manufactured by the Inventions Specialties Co., Sioux City, Ia.

### The Theft-Proof Lock

The Theft-proof lock, as shown herewith, consists of a nickel-plated ring, attached permanently to the steering post of an automobile. When lock is in a closed position a strong case hardened steel pin passes through the outside steering column into the steering tube, thus holding the steering gear so the position of the front wheels cannot be changed. The lock is self-adjusting. You simply close the lever, turn the key and step out of the car. The moment the wheel is turned, the pin snaps into place and the front wheels are locked in one position. The lock is the product of Hershey Mfg. Co., Denver, Colo.

### Howe Spot Lamp

Because of the demand for spot lamps of lighter type, which would prove just as satisfactory as heavier shell lamp models, the Howe Lamp & Mfg. Co., Chicago, have placed a single shell model on the market. This model is very similar to other Howe models and has the same patented features. It is made entirely of brass, with the exception of bracket and clamp. The wires are protected by water-proof conduit and the turn button switch is also of waterproof construction. The price is \$10. When provided with a plate mirror, which is optional, the price is \$11.50.



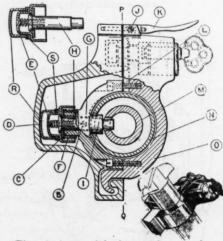
The Blooming oil cup.



B-R match box holder is attached to the steering wheel and eliminates the discomforts of searching through your pockets for matches while driving



This Howe spot lamp is of lighter construction than the previous models



The theft-proof lock attaches to the steering wheel

### The Blooming Cup

The cup shown is designed to operate when the car is in motion. Its action is dependent upon four factors; splashing due to constant vibration; the action of gravity; capillary attraction and the suction caused by the flexing action of the bearing. The excessive flow is retarded automatically by a vacuum created in the cup. It is of simple construction without moving parts of any kind. The Blooming cup has an 1/8 standard pipe thread, which makes it interchangeable with all oil and grease cups in present use. Before installing these cups it is necessary to thoroughly clean the bearing and see that all grease is removed. These cups are manufactured by Bloom Flusher Co., Tiffin, Ohio.

### Waller Cutout

The Waller cutout shown is a solid casting of simple construction. It may be installed in a few minutes by any one, without the use of special tools for cutting the exhaust pipe. The test plug from the exhaust is removed and the cutout screwed in its place. After this it is only necessary to bore a hole through the body sill at bottom of front door on the driver's side, fasten lever on door post with two screws and connect cable with cutout. It is built and designed especially for the Buick car by the Waller Cutout Co., Oelwein, Ia., and lists at \$5.

### Dunn Counterbalances

Counterbalances for the Dodge, Overland Four, and Chevrolet are now being placed on the market by the Dunn Mfg. Co. of Clarinda, Ia., at the following prices f. o. b. factory:

 Dodge
 \$12.00

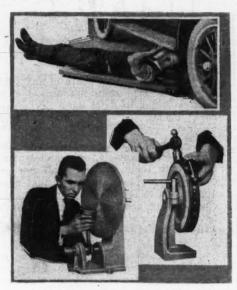
 Overland Four
 10.00

 Chevrolet
 10.00



Waller cutout is built especially for the Buick car

# Service Equipment Time Savers for the Shop



Continental creeper, Continental piston aligner and Continental riveting jig

### Schulz Radiator Repairing Process

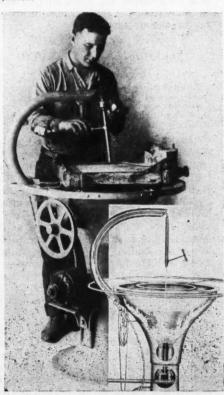
The Schulz process of radiator repairing is a patented process and is licensed to be used with the Schulz repair machine, shown in the illustration. The apparatus for using the Schulz process consists of two tanks and a soldering machine as shown. The first tank is used to boil an Okite solution and is heated by Bunsen burners. The second tank is used for water to rinse the radiator and to test it in locating leaks. The soldering machine consists of a pedestal which holds the melting and serve as a heat retaining jacket for it, two Bunsen burners mounted in the base used to heat the melting bowl, a pump inside the bowl to force the solder through the distributer pipe; a 1/12 hp. motor to operate the pump, a solder distributing pipe, with heat retaining jacket and priming burner which can easily be removed and used for a blow torch. Licenses and machinery can be obtained from the Automotive Radiator Machine Co., Fort Dodge, Iowa.

### Continental Creeper

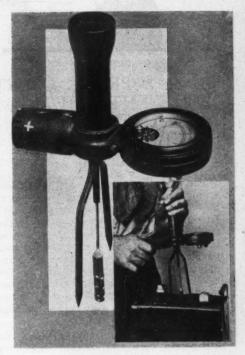
When you go under the car, you go under to work; to fix the parts that need attention. Your customer is paying for the time spent on his car. The device shown, which is a product of the Continental Auto Parts Co., Columbus, Ind., is a handy little device enabling you to get around under the car without waste of time or energy. It is well constructed and the strips of metal conform to the shape of the body.

### Cadmium Test Device

The Cadmium testing device, shown herewith, is a very valuable piece of testing equipment for the battery service station. It is simply designed and all wires have been done away with, because wires are awkward to handle and hard to keep in serviceable condition. One very important feature is that each set of readings are taken under the same contact conditions. It is only necessary to place the prods on the terminal of the cell to be tested, allowing the Cadmium metal, which is mounted movably in handle of device, to project into the electrolyte through filler hole in cell. There is a switch provided with three contact divisions. When in center position the voltmeter is connected to outside prods, giving cell voltage. To obtain negative cadmium reading or reading of negative plates, it is only necessary to turn switch to the left. To obtain positive cadmium or positive plate reading, the switch is turned to the right. The only instructions necessary for the use of this instrument are that positive prods must be placed on the positive posts of the cells. This is to be manufactured by the Quality Electrical Products Co., 907 East 15th St., Kansas City, and will list at \$22.50.



Schulz radiator repairing process is patented and is licensed to be used with the repair machine shown above



Cadmium testing device

### Piston Aligning Device

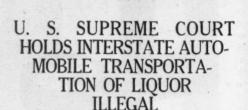
The piston aligning device shown is composed of a disk 16 in, in diameter and has a polished face at right angles to the arbor, so all types or sizes of pistons may be tested out. The machine is strong enough so that rods may be straightened with the assistance of a bending bar, while in the machine. In actual operation the lower connecting rod bearing is clamped around the correct size bushing, so it is fitted to the crankshaft and this bushing is placed on the standard sized arbor of the machine. The movable disk is then moved out against the side of the piston and is firmly clamped into position by use of the locking screw just back of the disk. The test is then made by ascertaining if the piston lines up exactly with the plate. The piston and rod may be swung back and forth across the plate, to ascertain the alignment of the lower rod bearing, and piston can be rocked on the piston pin to find the alignment of the wrist pin bearing. This is a product of the Continental Auto Parts Co., Columbus, Ind.

### Continental Riveting Jig

The jig shown can be bolted to a work bench where the riveting work can be conveniently handled. It is a very handy device for handling work in connection with Ford transmission bands. In actual use the band is placed around the mandrel and drawn tight with a clamp bolt. This jig is manufactured by the Continental Auto Parts Co., Columbus, Ind.

### Rusiness

By Wellington Gustin



The Supreme Court of the United States has just decided that the Federal Statute Act of Congress, March 3, 1917 (the Reed Amendment), prohibiting the transportation of intoxicating liquors in interstate commerce, except for specified purposes, into any state where the manufacture or sale of such liquors for beverage purposes is punishable, applies to the interstate transportation of liquor by its owner in his own automobile and for his own personal use.

The court says the statute makes no distinction between different modes of transportation in interstate commerce and, therefore, it was intended to include them all, that being the natural import of its words. Had Congress intended to confine it to transportation by railroads and other common carriers, it well may be assumed that other words appropriate to the expression of that intention would have been used. Further, Congress foresaw that if the statute were thus confined it could be so readily and extensively evaded by the use of automobiles, trucks and other private vehicles that it would not be of much practical benefit.

That the liquor was intended for the personal use of the person transporting it is not material, so long as it was not for any of the purposes specially excepted, said the court. These exceptions are where liquor is transported for scientific, sacramental, medicinal, and mechanical purposes.

Therefore, the District Court was reversed in its judgment discharging the accused, who, being in Cheyenne, Wyoming, "bought, paid for and owned" five quarts of whisky and, thereafter, in his own automobile transported it to Denver, Colo., intending there to devote it to his own personal use.

#### WHERE TO START PROCEEDINGS

Would it be necessary to start proceedings in Akron, O., or in Pittsburgh where the commission is due me? Would I be able to make the party come to Akrol for court, if I should enter suit here?—L. J. Ward, Akron, O. Would I be

It is always desirable to bring suit where you and your interests are located, if that be possible. In order to get SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted him.

service on your party, you will have to go where he may be found.

.

Since your debtor is located in Pittsburgh, you will have to go there, unless you can find sufficient property to attach in your own state, or unless the debtor is a corporation and maintains an agent in your state for the purpose of accepting service of summons.

### ILLINOIS LAW REGARDING TRAILERS

Publish the law in regard to the use of

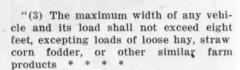
trailers in Illinois?

If the use of trailers is legal, must they be licensed?—Elmer W. Schaller, Mendota, Ill.

There is no law against the use of trailers in Illinois, neither does the trailer have to be licensed, the license for the motor car covering the trailer. However, the license of the propelling motor car must be displayed from the back of the trailer, instead of the car.

The laws applying to the use of the motor car and truck also apply to the use of the trailer. See the new Illinois Motor Vehicle Law, effective January 1, Among the important provisions of this law, that should be noted by one who contemplates the use of a trailer, are the following:

"Section 3-(1) The maximum gross load to be permitted on any axle of any vehicle shall not exceed sixteen thousand pounds; and the gross weight of any vehicle, including the weight of the vehicle and maximum load, shall not exceed eight hundred pounds per inch of the average width of tire of the road wheels of such vehicles in actual contact with the surface of the road \*



"(5) Where trailers are used the length of any vehicle, or vehicles, combined with their trailers, shall not exceed sixty-five feet: provided, that upon application to the highway or street officials having proper jurisdiction over a particular highway, special permits in writing may be granted for the operation of trains of trailers exceeding in length the foregoing, subject to such conditions as such highway or street officials may prescribe. On all highways under the control of, or required to be maintained in whole or in part by the state, such permission shall be obtained from the Department of Public Works and Buildings.'

Also, all trailers must have tires of rubber, or some material of equal resiliency, not less than three-fourths of an inch in thickness, but tires shall be considered defective and not permitted "if such tires have been so worn or otherwise damaged as to cause undue vibration when the vehicle is in motion or to cause undue concentration of the wheel load on the surface of the road. But this does not apply to trailers carrying agricultural products drawn by trucks at a speed not to exceed ten miles per hour.

### MUST AUCTIONEER PAY BROKERAGE TAX?

Is an auctioneer liable under Sec. 1001 a brokage tax of \$50?—Motor Inn, Finlayson, Minn.

Section 1001 of the General Statues of Minnesota (Tiffany) has no reference to your subject. There is nothing in the Session Laws referring to it. Section 6083 (Tiffany, 1913) requires that auctioneers be licensed and puts the fee at \$10. Further, the legislature has granted cities and villages the right to "restrain or license, regulate and tax auctioneers," etc., and to "fix the price of said license or tax, and prescribe the term of the contrivance of such license. The village council may refuse to grant any license; and \$25 a day is put as a reasonable price per day for an auctioneer's license."

I fail to locate anything in your state laws covering your question. Therefore, if the above does not cover it and you will give me proper references or more detailed explanation, I shall reply furh

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# The Automotive Repair Shop Practical Maintenance Hints

### Details of an Arbor Press for Garage Use

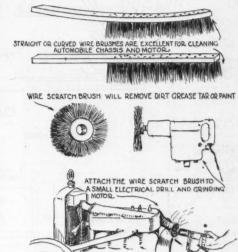
Many small garages worry along with sledge equipment for the removal of gears, bushings, wrist pins, arbors, etc., damaging parts and wasting considerable time. The better procedure is to invest in an arbor, while the next best procedure is to build one as cheaply as available materials will permit,

In the sketch an arbor press is shown that can readily be improvised from what would otherwise be scrap material. When intervals between jobs keep hands idle, turn this time into the construction of such a press, adding not only to the shop equipment but also resulting with labor and time-saving in effort.

With reference to the illustration the press consists mainly of pipe and steel plates. While the sketch shows the details, the parts can be varied to suit the materials at hand. The base consists of steel pipe screwed into pipe flanges secured to the floor with lag screws.

The press frame is steel plate riveted rigidly together. The gear is of the small pinion type used as timing gears on an engine.

The press bar can be made from a broken truck drive shaft using the heaviest shaft available. The rack in the bar can either be cut in with hack saw and chisel or this can be done in some shop that has a shaper. The remaining parts are either pipe cutting, threading, or hacksaw jobs which are easily done.



### Wire Brush for Cleaning Automobile

The preliminary cleaning of the running gear of automobiles, prior to overhauling and painting work can be expedited by using wire brushes.

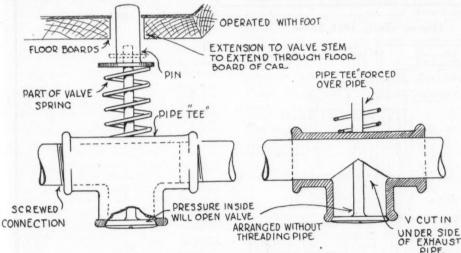
The straight or curved hand brush is fast and dirt, grease, tar, etc., will respond readily to the wire brush, but rapid results can be obtained by mounting a circular wire scratch brush in an electric hand drilling fixture and attacking the chassis.

One of these scratch brushes, as is used for cleaning castings from the foundry, is not expensive and the surfaces cleaned with it are in proper condition for painting afterwards, inasmuch as it will not only remove dirt but rust and paint as well by holding it firmly against the surface to be cleaned.

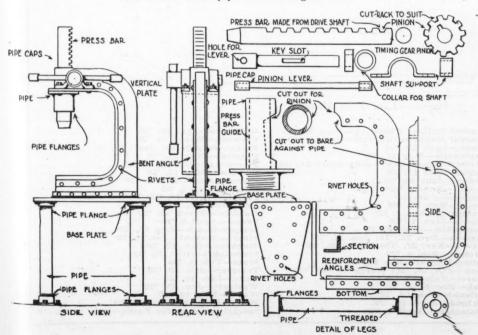
### Cutout Made From Pipe Tee and Engine Valve

A simple form of cutout for the exhaust pipe of the engine is shown in the illustration. This cutout valve as arranged is self-acting, and will open where accumulated gases fire in the muffler pipe. This relieves the pressure that otherwise will ordinarily blow the muffler apart. The exhaust pipe is either cut apart, and the ends threaded or the pipe tee forced over the pipe after cutting a "V" shaped opening into the under side of the part.

A discarded valve and part of a valve spring are arranged as shown, the valve stem being placed through a drilled hole in the pipe fitting, and the upper and extending through the floor board. The valve is retained on its seat by the spring, washer and a pin through the valve stem.

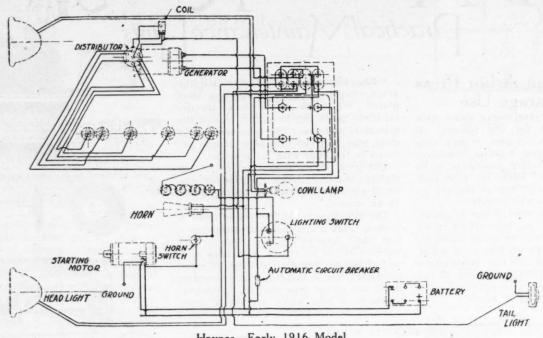


Cutout made from pipe tee and engine valve

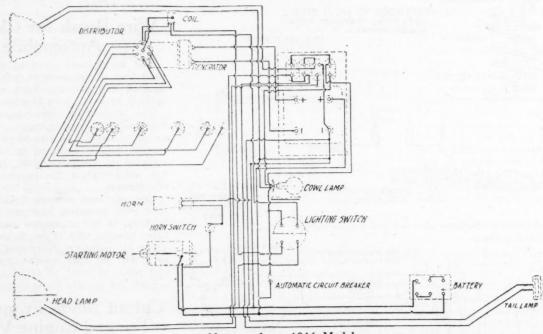


Arbor press made of discarded pipe and steel plate

### Motor Age Weekly Wiring Chart No. 83



Haynes-Early 1916 Model



Haynes-Late 1916 Model

Name of car and date on which wiring diagrams have appeared in previous issues

Allen—Dec. 18, '19; June 17, '20
Auburn—Nov. 27, '19; April 1, '20
Briscoe—May 6, '20
Cadillae—April 22, '20
Chalmers—Nov. 27, '19; June 17, '20
Chandler—May 20, '20
Cole—June 10, '20
Cote—June 10, '20
Crow-Elkhart—April 22, '20
Cutting—Nov. 6, '19
Daniels—Dec. 4, '19
Davis—Dec. 4, '19
Dixle—April 1, '20
Dodge—April 15, '20
Dorris—Dec. 11, '19
Dort—March 25, '20
Elcar—May 6, '20
Franklin—Dec. 11, '19; June 3, '20

General Battery Charging—Sept. 15, '19
General Magneto Diagram—June 5, '19
Grant—April 29, '20
Hupmobile—May 27, '20
Internal Connections—July 10-17-24, '19
Jeffery—May 13, '20
Jordan—June 10, '20
Keeton—Nov. 6, '19
King—May 20, '20
Kissel—May 27, '20
Lexington—Jan. 1, '20
Liberty—Jan. 1, '20
Liberty—Jan. 1, '20
Locomobile—June 6, '20
Marmon—Dec. 25, '19; Jan. 22, '20
Mercer—Nov. 27, '19; March 25, '20
Mitchell—Jan. 8, '20
Moline-Knight—May 20, '20
Moon—Jan. 29, '20; March 11, '20
Nash—March 11, '20
Nash—March 11, '20
National—Feb. 12, '20
Ookland—April 15, '20
Oldsmobile—April 8, '20

Olympian—Jan. 22, '20
Packard—March 18, '20
Paige—July 3, '19; April 29, '20
Peerless—May 13, '20
Pierce-Arrow—Feb. 5, '20
Pierce-Arrow—Feb. 5, '20
Pilot—March 4, '20
Premier—Dec. 18, '19; Feb. 26, '20
Reo—Nov. 13, '19
Roamer—March 18, '20
Saxon—April 8, '20
Saxon—April 8, '20
Scripps-Booth—Jan. 15, '20
Stephens—Feb. 12, '20
Studebaker—Dec. 25, '19
Stutz—Feb. 5, '20
Templar—Jan. 29, '20
Velic—Feb. 19, '20
Westcott—Jan. 15, '20
White—Feb. 19, '20
White—Feb. 19, '20
White—Feb. 19, '20
Willys-Knight—Feb. 26, '20
Special Systems for Fords—May 15-22, '19

### SPARK PLUG SIZES

### For 1919 and 1920 Cars

Motor Age Maintenance Data Sheet No. 102

One of a series of weekly pages of information valuable to service men and dealers—save this page

SPARK	PLUG	SIZES	FOR	1919	CAR

SPARK PLUC	Siz	ES	FOR	1919	CAR
					Туре
Car and Model Allen, 41		Size	Thread		Regula or Extensi
Anderson All		7/8	18	Re	gula
Apperson, 8-19 Argonne Auburn, 6-39-H		7/8	18	****	tensi
Beggs, 19 Biddle	7	/8	18		gulai
Bour-Davis, 20	··· 7	/8	18	*****	gular
Briscoe, 4-24 Buick, H-45, K-	7	/8	18	Re	gular
Cadillac Case, II-19	:		18	Re	gular
Cadillac Case, U-19 Chalmers, 6-30 Chandler Cleveland, 40 Climber, T-4-40 Cole Aero Eigh All Columbia All	77 77 77	/8 /8 /8 /8	18 18 18 18	Reg Reg	gular gular gular gular gular
Comet	1/	8	18 18	Reg	ular ular
Commonwealth : Crow - Elkhart	7/	8	18		ular
Crow - Elkhart K-36 & 46 Cunningham, V-3.		8	18 18		ular
Daniels, B. Davis, All. Dixie Flyer, H-S-5 Dodge Brothers. Dorris, 6-80. Dort, 8 & 11.	7/	8 8 8 8 8	18 18 18 18 18	Reg Reg Reg Reg Reg	ular ular ular
Economy Elcar	*****		****	*******	
Elgin, Series H Essex, A	7/8		18	Regu	
Ford, All Franklin, Series 9	. 1/2 7/8		etric 14 18	Regu Regu	lar
Grant, GX	7/8			Regu	
Harroun, A-A-1 Harvard Hatfield, A Haynes, 45 Haynes, 46 Holmes, All Hudson, M	7/8 7/8 7/8 7/8 7/8 7/8		18	Regu Regu Regu Regul Regul	lar lar lar
Hupmobile, R Jones, 27	1/0	1	8 1	Regul	ar
Jordan	7/8		8 I 8 I	Regul Regul	ar ar
King Kissel Custom Built	7/8	1	8 I	Regul	ar
Built Klinekar, 6-42-H Lexington	7/8	1		Regula	ar
lberty, 10-B	7/8 7/8 7/8	18	S	egula pecia egula	1
Maibohm, B	7/8 7/8 7/8 7/8 7/8 7/8 7/8 7/8	18 18 18 18 18 18 18	R R R R R	egula egula egula egula egula egula egula egula	ir ir ir ir ir ir ir
oon, Victory	/8 /8	18 18 18	Re	gula	r
orma 7	/8	18 Metr 18	ic Re	tensi gular gular gular	
akland, 34-B 7	/8	18	Re	gular	
usmobile, 45-B 7	/8	18		********	
eriand	/8	18	Ex	tensi	on
ven - Magnetic, W42			******	*********	12
vv42 7	18	18			

			Throne
C			Type Regular
Car and Model	Size	Thread	or or
Packard, All	7/8	18	assection of
		18	Regular
Dan American, 6-48	7/8	18	Regular
Darenti	.,,	10	Regular
Paterson	7/8		Doonal
Peerless, 56	7/8	18	Regular
	******		Regular
Piedmont		****	**********
Pierce Am	*****	****	***********
Pilot, 6-45	7/8	1.8	Regular
Premier, 6-B	7/8	18	Regular
	7/8	18	ares arai
Reo	1/2	Din	
nevere C	7/8	Pipe 18	
atoamer, All	7/8	18	Regular
R. & V. Knight, L	7/8	18	Regular
Sayers, BP		10	Extension
Scripps-Booth, 6-39	7/8	18	Regular
Seneca, H.	7/8	18	Extension
Singer	7/8	18	Regular
Spacke	*****	****	
Standard 8	7.10	****	*****************
Stearns	7/8	18	Regular
Stearns	*****	****	***********
Stephens 70	7/8	****	******
Dudebaker All	1/2	18	Extension
Stutz, G	7/8	1.0	Regular
Tomal	1/0	18	Regular
Templar, 445	7/8	18	Regular
Tuleo C	7/8	18	regular
	7/8	18	Regular
Velie			regular
	7/8	4.0	***********
Wagtasti	1/0	18	Regular
Westcott, All	7/8	18	Regular
		****	resular
	7/8	18	Regular
Winton, 24	/8	18	Regular
			Sulai

### SPARK PLUG SIZES FOR 1920 CARS

Car and Model	Siz	e Threa	Regular	
Allen, 43	m.			
Apperson, 8-20	7/8	8 18	Regular Extension	
21dbull, 6-39	7/8	3 18	Regular	
Beggs Biddle, B-1 & B-5 Bour-Davis, 21 Brewster Briscoe	7/8	18	Regular Regular Regular	
Briscoe, 4-34. Buick, H-45, K-45 Cadillac	7/8 7/8		Regular Regular	
Chalmers, 6-30	7/8 7/8	18 18	Regular Regular	
Cleveland, All	7/8 7/8 7/8	18 18 18	Regular Regular Regular	
Columbia, All	7/8 7/8	18 18	Regular Regular	
Crow-Elkhart, All Cunningham, V-4	7/8 7/8 7/8	18 18 18	Regular Regular	
Daniels, D-19 Davis, All Dixie Flyer, H-S-70 Dodge Brothers Dorris, 6-80 Dort, 10 & 15	7/8 7/8 7/8 7/8 7/8 7/8	18 18 18 18 18	Regular Regular Regular Regular Regular Regular	
Economy	7/8	18	Regular Regular	
Elcar	******	****	***********	
ESSEX, A 12	7/8 MM	18 Metric	Regular Regular	
Ford, T, All.	7/8 1/2 7/8	18 Pipe	Regular Regular	
Gardner	7/8	18 18	Regular Regular	7
Cront III	7/8	18	Regular	1
			STATE OF THE STATE	

r	Hanger 54		Siz		hreads		nsion
r	Hanson, 54 Harroun, A-A Harvard Hatfield, A-42 Haynes, 47, &	-2	7/	8	18 18	Regu	lar
	Hatfield, A-42 Haynes 47 &	40	7/	8	18	Regu	
r	Haynes, 47 & H. C. S. Hollier, 206-B. Holmes, All	48	1/1		18	Regu	lar
	Holmes, All		7/8	3	18 18	Regul	
	Hudson, O Huffman, W Hupmobile, R.		7/8		18	Regul	ar
-	Jackson, 6-38	******	7/8		18 18	Regul	
	Jackson, 6-38 Jones, 28 Jordan, M	******	7/8		18 18	Regul Exten	ar
n					18 18	Regul	ar
n	King Kissel, Cust Built Kinekar, 6-55-J	o m	7/8		18	Regul	ar
	LaFayette		7/8		18	Regula	ar
	LaFayette Leach Lexington	*****	7/8 7/8		18 18	Regula	ar
	Lexington Liberty, 10-C. Locomobile, Malbohm R	4.0	7/8		18	Regula	
n	Lorraine, 20-T.		7/8		18 18	Special Regula	
	Marmon, 34-B		7/8		8	Regula Regula	r
	Maibohm, B Marmon, 34-B Marshall, K Maxwell, 25 McFarlan, All Mercer, Series 5		7/8		8	Regula	
	Mercer, Series 5 Meteor, R		7/8	1	8	Regula Regula	r
	Metz Master Six		/8 /8 /8	1	8	Regula	r
	Monitor, M. & O.	7		1	8	Regula Regula	r
	Mitchell, F-40 Monitor, M. & O Monroe, S9 & S Moon, 6-48 Moore, G.	10 7	/8 /8	1		Regula: Regula:	r
			/8 /8	18	8 .		
	Nelson	3B 7	/8	18	3 1	Extensi- Regular	
	NomaOakland, 34-C	7		Met 18	B	Regular Regular	
				18		Regular	
	Oldsmobile, 37-A Oldsmobile, 45-B Olympian, 45 Cverland, 4.	- 7/	8	18 18		***************************************	
	Cverland, 4 Owen-Magnetic, 6	0 7/	2	Pip	e E	xtensio	n
	Packard, All	- 7/	8	18	***	egular	
	Paige, All Pan American, 6-5;		8	18 18	R	egular egular	
1	Parenti, H	7/	8	18 18	R	egular	
i	Paterson	7/8	8	18	R	egular	
i	Pierce-Arrow, All	7/8	3	18	R	gular	
Ī	Pierce-Arrow, All Pilot, 6-45 Porter, 46 Premier, 6-D	7/8 18 Mi	М	18	Re	gular	
F	Reo	7/8		18		Sulai	
R	Reo ReVere, D Coamer, All L. & V. Knight, J L. & V. Knight, R	7/8		18 18	Re	gular	
R	& V. Knight, J. & V. Knight, R.	******		****	*****	gular	
SS	cripps - Booth	7/8		18		gular	
Se	eneca I 20	7/8		18	Ex	tension	
Si	overin, H	7/8 7/8 7/8		18 18	Re	gular gular	
SI	celton, 35andard, 8	7/8		18	Reg	gular	
OL	earns	7/8		18	Reg	gular	
St	ephens, 80	7/8 7/8		18	Ext	ension	
	udebaker, All	1/2 7/8	P	18 ipe	Reg	ular	
Tε	emplar 445	7/8		18	-	ular	
10	exan, A-38	7/8	1	8	******	ular	
W	elie, 34 & 48asp, 2011	7/8	1	8		*******	
W	estcott. All illys-Knight, 20	7/8	1	8	Reg	ular	
A.A. I	inther, 61inton, 25	7/8 7/8 7/8 7/8 7/8	1	8	Reg	ght ular	
		1/8	1	8	Reg	ular	

G-E

G-D-G-K

G-K

G-K

G-K

G-K-G-K-G-K-K

G-K-G K

K

G-K-G-K-G-K

### Motor Age Monthly Guide to Tractors

	Manufacturer	Tractor and Model	Drawbar horsepower	Belt horsepower	Number plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of engine	N . and type of cylinder	Bore and stroke	Nermal R P M
		(Oil Pull	12	20	3	22 x 36	2150	6682		Wh.	51	Own	2 Her.	6 x 8	560
Ad	vance-Rumely Thresher Co., Laporte, Ind	Oil Pull	16	30	4	28 x 44	2850	9600		Wh.	56	Own	2 Hor.	7 x 8½	530
	The state of the s	Oil Pull.	20 30	60	5-6 8-10	32 x 52 36 x 60	3750 5900	12820 26700		Wh.	64 80	Own Own	2 Hor. 2 Hor.	8 x 10 10 x 12	45 37
A 11	is-Chalmers Mfg. Co., Milwaukee, Wis	Allis-Chalmers, 18-30	18	30	4	30 x 00	3000	6000	\$1,885	Wh.	50	Own	4 Ver.	434 x 61.5	83
	pleton Mfg. Co., Batavia, Ill	Appleton	12	20	2-3	22	2000	4900	1,500	Wh.	54	Buda	4 Ver.	414 x 512	105
9	Tracks	Aultman Taylor	15	30	4	28	2800	7500	2,300	Wh.	70	Clim.		5 x 616	90
Au	ltman-Taylor Machinery Co., Mansfield, O	Aultman Tooler	22	45	6	1 32	4800	13000	3,700	Wh.	70	Wauk. Own	4 Ver. 4 Hor.	434 x 634 518 x 8	)
		Aultman-Taylor	30	60	8-12	02	8000	23000	4,800	Wh.	90	Own	4 H cr.	7 x 9	50
Au	tomotive Corp., Toledo, Ohio	Automotive, B-3	12	24	. 2	26	2000		3,400	Wh.	40	Herc.	4 Ver.	4 x 5½	100
		Avery, 8-16	8	16	2-3	22 x 32	1800	4900		Wh.	50	Own	2 Hor.	5½ x 6	600-
		Avery, 12-25	12	25	3-4	20 x 30	2800	7500		Wh.	56	Own	2 Hor.	61/2 x 7	600-
	figure 1.	Avery, 14-28	14		3-4	24 x 36	3000	6800		Wh.	60	Own	4 Hor.	45/8 x 7	700-
Av	verý Co., Peoria, Ill	Avery, 18-36	18	36	4-5	24 x 36	3500	9250		Wh.	65	Own	4 Hor.	51/2 x 6	650
		Avery, 25-50	25	50	5-6	28 x 46 28 x 46 32 x 54	4800	12500		Wh.	69	Own	4 Por.	61 2 x 7	600
	and the second s	Avery, 40-80	40	80	8-10	32 x 34 36 x 60	7600	22000		Wh.	8712	Own	4 Hor.	734 x 8	. 500
Ba	tes Mach. & Trac. Co., Joliet, Ill	Steel Mule	15		3	26 x 36		4600		Cr.		Erd	4 Ver.	414 x 6	Se
	I D 4G m G G I b G H	Tracklayer, B	12	25	3		2000	5100	2,600	Cr.		Own	4 Ver.	45% x 514	8
C.	L. Best Gas Trac. Co., San Leandro, Calif	Tracklayer, A	35	60	9		3500	17500	5,750	Cr.		Own	4 Ver.	6½ x 3½	6
Bo	oring Tractor Corp., Rockford, Ill	Boring		24	2-16	24 x 26		3600	1,595	Wh.	54	Wauk.	4 Ver.	43 8 x 514	10
	ickeye Mfg. Co., Anderson, Ind	Trundaar, 10	25	40	4		3750	8800	3,750	Ch. T.		Wauk.	4 Ver.	5 x 614	9
	nil Tractor Co., Anderson, Ind	BullBurn-Oil	12	24	2-3 3-4	26 26	1000	4996 5500	1,200 1,650	Wh.	60 56	Toro Own	2 Hor. 2 Hor.	51 2 x 7 63 4 x 7	7
DU	ırn-Oil Tractor Co., Peoria, Ill	Durn-Oil		0.0	9-4	20	5000	3500	1,000	** :1.	30	Own	2 Hot.	0.4 X 1	
J.	I. Case Plow Works Co., Racine, Wis	Wallis, K	15	25	3	24 x 40	2600	3560		Wh.	48	Own	4 Ver.	414 x 534	6
		Case, 10-18	10	18	2-3	20 x 28	1665	3820	1,800	Wh.	42.	Own	4 Ver.	37/8 x 5	10
J.	1. Case T. M. Co., Racine, Wis	Case, 15-27	15 22	27 40	3-4	26 x 46 32 x 54	2500 3760	9700	1,800 2,850	Wh.	52 56	Own Own	4 Ver. 4 Ver.	412 x 6 512 x 634	8
CI	eveland Trac. Co., Cleveland, Ohio	Cletrac, W	12	20	2	24 x 40	1500	3400	1,395	Cr		Own	4 Ver.	4 x 51/2	120
	oleman Trac. Sales Co., Kansas City, Mo	Coleman	16		3	28 x 48	3000	5200	1,850		44	Clim.	4 Ver.	5 x 612	7
D	art Truck & Trac. Corp., Waterloo, la	Blue J	15		3-4	28	2500	4500	2,000	Wh.	42	Buda	4 Ver.	41/2 x 6	10
-	and Mr. C. Sandalan Okia	Sandusky J	10	20	3	22	2000	4080	1,650	Wh.	48	Own	4 Ver.	41/4 x 51/4	10
D	auch Mfg. Co., Sandusky, Ohio	Sandusky, E	15	35	4	30	3500	7670	2,500	Wh.	56	Own	4 Ver.	5 x 61/2	7
		Leader, B	12		2	20	2000	5200			48	Own	2 Hor.	614 x 6	8
D	ayton-Dowd Co., Quincy, Ill	Leader, N	. 16		3-4	28	3500	5800	2,150	Wh.	54	Clim.	4 Ver.	5 x 61/2	8
		Leader, C	18		3-4	28	4000	6500	2,650	Cr.		Twin	4 Ver.	5 x 7½	7
n	ill Trac. Mfg. Co., Little Rock, Ark	Leader, D Dill	20	40	4-5	28	5000	6500 4400	3,150	Cr. Wh.	42	Doman Cont.	4 Ver. 4 Ver.	6 x 7	7
	ubuque Trac. & Tr. Mfg. Co., Dubuque, Ia	Klumb, F	16	32	3	28	3200	5250	2,480	Wh.	45	Clim.	4 Ver.	4½ x 5½ 5 x 6½	9 8
	agle Mfg. Co., Appleton, Wis	Eagle, F	12		2-3	24	2400	5850	1,390	Wh.	48	Own	2 Hor.	7 x8	4
		Eagle, F	16	30	3-4	28 x 30	3200	7100	1,850	Wh.	52	Own	2 Hor.	8 x8	4
E	lectric Wheel Co., Quincy, Ill	Allwork, C			3	28	3000	5000		Wh.	48	Own	4 Ver.	5 x 6	8
-		E-B, Q			3	24	2000	6500		Wh.	60	Cwn	4 Ver.	434 x 5	8
E	merson, Brantingham Co., Rockford, Ill	E-B, 12-20, AA E-B, 20-35			3 5	24 28	2600 3300	4355 9700		Wh.	54 72	Own	4 Ver.	43/4 x 5	9
		E-B, Reeves	1		8-10	44	10000	22750		Wh.	90	Own Spec.	4 Ver.	5½ x 7 7¼ x 9	5
F	egeol Motors Co., Oakland, Calif	Fageol, D			2		1450	3500	1,525		48	Lyc.	4 Ver.	31/2 x 5	12
	ord & Sou, Inc., Henry, Dearborn, Mich	Fordson		20	2	20 x 34	1800	2700	850	Wh.	42	Own	4 Ver.	4 x 5	10
	our-Drive Trac. Co., Big Rapids, Mich	Fitch, 4			3-4	28 x 30	3200	6000	3,300	Wh.	F-36x12 R-42x12	Clim.	4. Ver.	5 x 61/2	. 8
	ranklin Trac. Co., Greenville, Ind	Franklin Flexible, B			2-3	22 x 36 22 x 26	2500	3500 5800	1,695	Cr. Wh.	None 60	Erd. Erd.	4 Ver. 4 Ver.	414 x 6	900-
E	ick co., nayheololo, fa	Frick			3-4	26		6000		Wh.	60	Beav.	4 Ver.	434 x 6	900-
G	eneral Ordnance Co., Cedar Rapids, Ia	G-0		1	3	30		4200	1,485	Wh.	46	Wauk.	4 Ver.	41/2 x 53/4	10
	eneral Tractors, Inc., Chicago	Monarch		1	2			4000	1,650	Cr.		Own	4 Ver.	4 x.4	10
	m . C . W	Monarch			4	28	3300	8000	2,700	Cr.		Beav.	4 Ver.	434 x 6	1
	ray Tractor Co., Minneapolis, Minnart-Parr Co., Charles City, Ia	Gray	18	36	4 3	28	2700 3000	6185 5570	1,495	Wh.	54 52	Wauk. Own	4 Ver. 2 Hor.	43/4 x 63/4	1
	olt Mfg. Co., Peoria, Ill.	Caterpillar, 5-Ton	25		4	32 x 52	3100	9400	1,490	Cr.	32	Own	4 Ver.	6½ x 7 4¾ x 6	1
		Caterpillar, 10-Ton		1	6	40 x 60	5000	18800		Cr.		Own	4 Ver.	6½ x 7	1
-	lolton Tractor Co., Indianapolis, Ind		. 10		2-12			2500	1,250	Wh.	42	Le Roi		314 x 414	1

Abbreviations: Traction—Wh., wheel; Cr., crawler. Engine—Beav., Beaver; Veer., Veerac; Herc., Hercules; Wauk., Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; Auto., Automatic; Weid., Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten, Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., Vertical; Hor., horizontal; Opp., opposed. Fuel—G, gasoline; K, kerosene; D, distillate. Carburetor—Ray., Rayfield; King, Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Web., Webster; Zeph., Zephyr; Ens., Ensign; Strom., Stromberg; Till., Tillotson; Zen., Zenith; Car., Carter. Air-Cleaner—Donal., Donaldson; Ben., Bennett; Hol., Holley. Magneto—A-K., Atwater-Kent; Sum., Sumter; Eise., Eiseman; Berl., Berling. Clutch—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; spec., special. Gaarset—B. & S., Brown & Sharpe; Nutt., Nuttall. Gearset type—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding jaw clutch. Final Drive—S. G., spur gear; Ch., chain; D. R., double reduction; B. G., bull gear. Drive—Op., open; In., inclosed.

matic; soline; lotson; Beck; netary;

### and Their Technical Specifications

Fuel	Make and size of carburetor	Make of air cleaner	Make of magneto	Make of clutch	Make of gearset	Type of gearset	Make of radiator	Make of bearings in transmission	Make of bearings in front axle	Make of bearings in rear axle	Belt pulley diameter	Belt pulley R. P. M	Belt Speed F P. M.	Speeds forward	Speed range M. P. H.	Recommended plowing speed	Final Drive	Drive	Furrow wheel
K-D	21/4-Own	Donal.	Bosch	Own	Own	Sl. G.	Own	Own	Hyatt	Hyatt	19	560	2790	2	2.1-3.26	2.1	S. G.	Op.	No.
K-D K-D	2½-Own 2¾-Own	Donal.	Bosch Bosch	Own Own	Own Own	Sl. G. Sl. G.	Own Own	Own Own	Hyatt Hyatt	Hyatt Hyatt	23 26	530 450	3190 3060	2 2	2.1-3	2.1	S. G. S. G.	Op.	No.
K-D	31/4-Own	None	Bosch	Own	Own	Sl. G	Own	Own	Own	Own	36	375	3540	1	1.9	1.9	S. G.	Op.	No.
G-K	1½-King	Ben.	Opt.	Own	Own	SI. G.	Own	Hyatt	Own	Hyatt	15	830	3200	2	2.3-2.8	2.8		In.	Yes
G-K	11/4-Scheb.	Ben.	Bosch	B. & B.	Nutt	Sl. G.	Perfex	Hyatt	Own	Hyatt	71.9	825	2600	2	21/4-31/2		1. G.		Yes
-K-D	13/8-King	Ben.	Eise.	Own	Own	Sl. G.	Hooven	Hyatt	Own	Hyatt	20	450	2400	1	2.2-2.49	2.5	I. G.		Yes
G-K-D	2 -King		Eise.	Own	Own	Sl. G.	Own	Own	Own	Own	20	600	3150		1-2.93	2.13	B. G.		No
J-K-D	2½-King		Eise.	Own	Own		Own	Own	Own	Own	24	500	3150	2.2	1-2.2	2.2	B. G.		No
G-K	11/4-King.	Ben.	Eise.	B. & B.	Own	Sl. G.	McCord	(U. S.	Timk.	Timk.	10	996	2600	2	214-4	214	1. G.	In.	Yes
								Gurney	}	-									
	41 472		77.117		0	a w	0	Hyatt				200	0770		40.40		0.0		
G-K D-A	114-King.	*******	K-W	Own	Own	C. M.	Own		Own	Own	171/2	600	2750	2	13/4-3	13/4	S. G.	Op.	
G-K-D	11/2-King.		K-W	Own	Own	C. M.	Own		Own	Own	1916	600	2910	2	134-234	134	S. G.	Op.	
G-K-D	114-King.		K-W	Own	Own	C. M.	Own			Own	16	700	2930	2	21/3-31/2	2	S. G.	Op.	
G-K-D	11/2-King.		K-W	Own	Own	C. M.	Own		Own	Own	18	650	3065	2	2-3	2	S. G.	Op.	
CKD	2_Kina		K-W	*Own	Own	CM	Owe		Over	Own	99	600	2000	9	9.2	2	80	On	
G-K-D	2-King.		V-11	Own	Own	C. M.	Own		Own	Own	22	600	2880	2	2-3	2	S. G.	Op.	
G-K-D	2-King.		K-W	Own	Own	C. M.	Own		Own	Own	26	500	3400	2	13/4-22/3	134	S. G.	Op.	
G-K-D	114-Ben.	Ben.	Dixie	В& В.	Own	Sl. G.	Modine	Timk.	Timk.	Т. & Н.	12	725	2300	2	2.33-3.5	2.33	S. G.		
n	11/ P	Don	Calit	Ower	Own	81.0	0	(Hugas	)	Unett	0	0000	1071	9	91/ 9	9	10	100	P. L. M. E.
D	1½-Ens.	Ben.	Split.	Own	Own	Sl. G.	Own	Hyatt Timk.	}	Hyatt	9	9000	1971	2	21/4-3	3	I. G.		
D	2-Ens.	Ben.	Bosch	Own	Own	Sl. G.	Own	Hyatt		Timk.	16	650	2720	2	3-2	3	I. G.		
								Timk.	1								15-		
G-K	11/4-King.	Ben.	King.	Twin	Own	SI. G.	Perfex.	Hyatt	Hyatt	Hyatt		421		2	2-3	22/3	Ch.	In.	Yes
G-K-D	-Strom.	Own	Bosch	Hill.	Own	Sl. G.	Modine	Opt.		Н. & Т.	10	900	2600	2	1.3-2.5		S. G.	In.	
G-K-D K	1½-King. 1½-Scheb.	Donald. Ben.	K-W K-W	Own	Own	Sl. G.	Eureka	S.K.F.	Own	Hyatt Own	12	750 700	2600	1 2	2.4-23/1	2.4	B. G. I. G.	In.	Yes
A.	1/2 Genera.	Den.	11-11	Own	Onn	or or	Luicka	Hyatt	Comi	· will	100	100	2000	-	2-0	0	1. 0.	A21.	108
G-K-D	11/4-Ben.	Ben.	Berl.	Twin	Own	Sl. G.	Modine	Timk.	Hyatt	Timk.	18	430		2	11/2-31/2	212-312	S. G.		
K	11/8-King.	Own	King.	Own	Own	Sl. G.	Own	Hyatt	Own	Hyatt	1414	1050	3731	2	214-31/2	21/4	S. G.	In.	No
K	13/8-King.	Own	Bosch	Own	Own	Sl. G.	Own	Hyatt	Own	Hyatt	16	900	3762	2	21/4	21/4	S. G.	In.	No
K	2-King.	Own	Bosch	Own	Own	St. G.	Own	Hyatt   Timk.	Timk.	Hyatt	161/2	850	3669	2	1.2-3.2	2.2	S. G.	In.	No
G-K-D	11/8-King.	Own	Teagle	Own	Own	Sl. G.	McCora		Timk.	Timk.	8	1265	2500	1	1-31/2	3	I.G.	In.	Took to
G-K	11/2-Ben.	Ben.	Dixie	Own	Own	Sl. G.	Own	Opt.	Own	Own	14	750	2750	2	2-3	3	Worm		
G	114-King.	R. W.	Split.	Delt.	Own	Sel.	Own	Gurney	Timk.	Timk.	12	710	2600	3	11/4-6	212	D. R.	In.	Yes
G-K-D	114-King.	Ben.	Dixie	Own	Own	Sel.	Perfex	Hyatt	Own	Own	10	1000	2600	- 2	2-3	2	I. G.		Yes
OFF			D		6			N. D.	1			0.00	-						
G-K-D K	2 -King. 1½-King.	Ben. Own	Dixie King.	Own Own	Own Own	Sel. Sel.	C. & P. Eureka	Own	Own	Own	15 14	800 800	2950 2800	3 2	2-5½ 2¼-3½	2 21/4	I. G. I. G.	Cp.	No
K	1½-King. 1½-Strom.	Ben.	Eise.	B.&.B	Own	Sel.	Own	Own Opt.	Hyatt	Hyatt	14	800	2900	-	274-372	314	I. G.	Op. In.	
K-D	134-King.	Ben.	K-W	Own	Own	Sel.	Eureka	Own	Own	Own	14	750	2700	2	1.8-21/2	1.8	Ch.	Op.	
G-K-D	11/2-Holl.	Ben.	Dixie	Own	Own	Sel.	Eureka	Own	Own	Own	14	750	2700	2	1.8-21/2	1.8	Ch.	Op.	
G	11/2-King.	Donald	. Bosch	В.&В.	Cotta	Sl. G.	Eureka	S.K.F.	Hyatt	Hyatt				3	1-5	3	Ch.		
K	1½-Strom.	Ben.	Dixie	Own	Own	C. M.	Hooven	Hyatt	Hyatt	Hyatt	14	800	2600	2	21/2-4	21/2		In.	
G-K		Own	Dixie	Own	Own	Sl. G.	Perfex	Hyatt	Own	Own	20	450	2350	2-3	11/2	2	G.		Yes
G-K	41 / 771	Own.	Dixie	Own	Own	Sl. G.	Perfex	Hyatt	Own	Own	24	450	2827	2-3	11/2	2	G.		Yes
K	1½-King. 1½-Ben.	Ben. Ben.	King. K-W	Own Own	Own Own	Sl. G. Sl. G.	Perfex Perfex	Hyatt Own	Own	Own	13 <sup>1</sup> <sub>2</sub> 12	800 800	2500 2225	3	17/8-33/4 17/8-3.64	21/2	B. G. B. G.	Or	Yes
K	1½-Ben. 1½-Strom.	Ben.	K-W	Own	Own	Sl. G.	Perfex	Hyatt	Own	Own	12	900	2800	2	2.01-2.78	2.78	I. G.	Op. In.	No
K	1½-Ben.	Ben.	K-W	Own	Own	Sl. G.	Modine	Hyatt	Own	Hyatt	16	597	2500	2	1.81-2.33	2.33	G.	Op.	No
K	21/2-King.	Ben.	K-W	Own	Own	Sl. G.	Perfex	Hyatt	Own	Hyatt	22.	500	2880	1	2		G.	Op.	
G-K-D	1 -Zen.	Own	Dixie	Own	Own	C. M.	Modine		Timk.	Timk.	8	1250	2600	1	34-3	21/3	S. G.		f
K	-Holl.	Own	Own	Own	Own	Sel.	Own	Gurney	Timk.	Gurney	91/2	1000	2480	3	1-8	23/4	Worm	In.	
K	1½-King.	Ben.	Dixie	В.&В.	Cotta	Ind. Cl.	Spirex	S. R. B. Timk.	Timk.	S. R. B Timk.	14	650	2275	3	34-4		F. Bevel	}	No
G-K	114-King.	Ben.	Eise.	В.&В.	Own	St. G.	McCord	N. D.	Timk.	Timk.	10	1000	2618	3	2-3-4	3	R.Worm B. G.	In.	None
K	-King.	Ben.	King.	Own	Nutt.	S. S.	Perfex	Hyatt	Own	Own	13	900	3060	2	2.3-3.8	21/2	S. G.	and.	Yes
K	-Ben.	Ben.	Dixie	Own	Nutt.	S.	Perfex	Hyatt	Own	Own	13	900	3060	2	2.3-3.8	21/2	S. G.		Yes
G-K	11/4-King.	Ben.	Eise.		Own	C. M.	Perfex	S. K. F.			10	970		6	13/4-3	21/2	S. G.	In.	No
G-K-D	1-King.	Ben.	K-W	M.&E.	Own	Sl. G.	Perfex				1934	1000	2600	3	11/2-31/2	214	G.		
G-K-D	11/2-King.	Ben.	K-W	M.&E.	Own	Sl. G.	Perfex				16	600	2600	3	11/2-31/2	21/4	Ch.		
G-K K	1½-Ben.	Ben.	Bosch K-W	Own	Own	SI C	S-J	Hyatt	10000	Hyatt	113/8	850	2900	2	21/2	234	Ch.	In.	Yes
K	K-Shunt	Own	K-W	Own ·	Own	Sl. G.	S-J	S.K.F.	Own		14	750	2750	2	2-3	3	I. G.	Op.	Yes
G	11/2- Scheb.	Donald	Eise.	Own	Own	Sl. G.	Modine	1	Hyatt	Hyatt	12	1012	3150	3	1.5-5.7	3	G	In.	No
G	2 -King.	Donald		Own	Own	Sl. G.	Own	Hyatt	Hyatt	Hyatt	14	850	3120	3	1.65-4.78	3	G.	In.	No
G	7/8-King.	Ben.	Eise.	Detl.	Covert		Perfex	Tongo.		1 9 9	6	1250		3	3 -4	214	1. G.	1	. Yes

Abbreviations: Traction—Wh., wheel; Cr., crawler. Engine—Beav., Beaver; Veer., Veerac; Herc., Hercules; Wauk., Waukesha; Buffa, Buffalo; Asso., Associated Manufacturers; Auto., Automatic; Weid, Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten, Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., Vertical; Hor., horizontal; Opp., opposed. Fuel—G., gasoline; K., ketosene; D., distillate. Carburetor—Ray., Rayfield; King, Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Web., Webster; Zeph., Zephyr; Ens., Basign; Strom., Stromberg; Till., Tillotson; Zen., Zenith; Car., Carter. Air-Cleaner—Donal, Donaldson: Ben., Bennet; Hol., Holley. Magneto—A-K., Atwater-Kent; Sum., Sumter; Eise., Eiseman; Berl., Berling. Clutch—B. & B., Borg & Beck. Bier., Bierman; Mun., Muncie; Rock., Rockwood; spec., special. Gearset—B. & S., Brown & Sharpe; Nutt., Nuttall. Gearset type—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary Sl. J. C., sliding jaw clutch. Final Drive—S. G., spur gear; Ch., chain: D. R., double reduction; B. G., bull gear. Drive—Op., open; In., inclosed.

### Motor Age Monthly Guide to Tractors

Holes   Harder   Ha	THE PARTITION OF THE PA	Manufacturer	Tractor and Model	Drawbar horsepower	Belt	Number plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of engine	No. and type of cylinder	Bore and stroke	Normal R. P. M.
Table										1						1000
International Harvester Co., Chicago		Illinois Tractor Co., Bloomington, Ill		1	7.0											800 1000
T. T. Tractor Co., Clerebash (John.   Laterty   Latert		International Harvester Co. Chicago		1		-										575
Special Description   10		and the state of the same of t	/									66	Own			575
Sect Conservance Co., Mt. Verreen., Ind.   Clebe Conservance, No.   2   24   3   3   49   2500   5000   1,500   Wh.   60   Own   2   Nor.   7   5   5	1						30	3200			Wh.	48				1000
Kinama' de Sons Mig., Co., Minneagolis, Minn.   Flour City., # 14   24   33   24											*****					1200
Kinanard & Soun Mfg., Co. Minnespolis, Ninn.   Flour City.   20   35   4-5   28   10000   72   0 vm   4 Ver.   5\;\tau_1 City.   50   6   6-8   30   16000   8-8   21000   90   0 vm   4 Ver.   6\;\tau_2 \text{City.   60   70   5-10   35   21000   90   0 vm   4 Ver.   6\;\tau_2 \text{City.   70   6   72   25   25   25   25   20   20   20   2	1	Keck Gonnerman Co., Mt. Vernon, Ind		1					1	1,500	Wh.					700 800
La Crosse Trac. Co., La Crosse, Wis.   Elour City.	1	Kinnard & Sons Mfg., Co. Minneapolis, Minn.														800
La Crosse, Tune. Co., La Crosse, Wis.   La Crosse, G.   12   24   3   24   2000   4000   945   Wh.   50   0 m   2   2   16   7   6   17													Own	4 Ver.		550-600
Lausen_John Mag. Co., New Toloteis, Wis.   Full Jewel.   15   30   3-4   24   3.00   3000   6500   24,57   Wh.   54   Beav.   4 Ver.   4 \( \) 4\( \) 5\( \) 1   Magnet Tractor Co., Minneapolis, Minn.   Liberty   18   32   4   30   338   3000   24,57   Wh.   48   Clim.   4 Ver.   5 \( \) 4\( \) 5\( \) 1   Magnet Tractor Co., Minneapolis, Minn.   Magnet, B-14-28.   14   25   3   24   2000   4000   1,850   Wh.   48   Clim.   4 Ver.   4 \( \) 4\( \) 5\( \) 5\( \) 1   Magnet Tractor Co., Minneapolis, Minn.   Twin City, 16-30.   16   30   4   24 \( \) 20   32   3000   7800   Wh.   54   Own   4 Ver.   5 \( \) 5\( \) 5\( \) 1   Minneapolis Steel & Machinery Co., Minneapolis, Virtue, City, 46-56.   40   65   8   40   7500   27700   Wh.   54   Own   4 Ver.   5 \( \) 3\( \) 5\( \) Minn.   Twin City, 46-56.   40   65   8   40   7500   27700   Wh.   54   Own   4 Ver.   5 \( \) 3\( \) 5\( \) Minneapolis Steel & Machinery Co., Moline, Rill.   Wishing Flow Co., Moline, Rill.   Moline Cerbard,   9   18   2   24   2000   3380   Wh.   44   Own   4 Ver.   5 \( \) 3\( \) 5\( \) 1\(																450-500
Liberty Tractor Co., Minenapolis, Minn.   Magnet, B-14-28.   14   25   3   24   2500   3000   24.00   Wh.   48   Clim.   4 Ver.   4 \( \frac{1}{2} \)   Magnet Tractor Co., Minenapolis, Minn.   Magnet, B-14-28.   14   25   3   24   2500   2000   4000   Wh.   50   Own   4 Ver.   4 \( \frac{1}{2} \)   Minenapolis Steel & Machinery Co., Minenapolis, Vivia (Liy, 16-30.   16   30   4   24   25   300   2700   Wh.   50   Own   4 Ver.   4 \( \frac{1}{2} \)   Minenapolis Steel & Machinery Co., Minenapolis, Vivia (Liy, 26-54.   25   45   5   32 \( 2 \) 3   30 \( 2 \) 4   2500   3000   Wh.   50   Own   4 Ver.   6 \( \frac{1}{2} \)   Minenapolis Steel & Machinery Co., Minenapolis, Min.   Twice (Liy, 66-50.   0   9   12   40   1200   3200   Lib.   Wh.   48   Com.   4 Ver.   7 \( \frac{1}{2} \)   Minenapolis Steel & Machinery Co., Minich, Ala.   Wh.   Minenapolis Steel & Machinery Co., Minich, Ala.   Wh.   Minenapolis										1						900 950
Magnet Tractor Co., Minnespolis, Minn.   Magnet, B-14-28.																850
Trim City, 12-20.   12   20   3   20   24   2000   4200	-															900
Minnapolio Steel & Machinery Co., Minnespolio, Twin City, 24-54.   25   45   5   8   22   34   6700   10000   Wh.   84   Own   4 Ver.   74,354	-		/						4200		Wh.	50		4 Ver.	4½x6	1000
Minn.										1						650
Modile Tractor Co., Mobile, Ala.   Mobile   Tractor Co., Mobile, Ala.   Mobile   Tractor Co., Mobile, Ala.   Mobile																600 535
Mobile Tractor Co., Mobile, Ala.   Mobile   12   24   3000   1,430     Herc   44,545   4,565   1,565		Nijih,		1			1									535
Moline Plow Co., Moline, Ill.   Moline Orehard.   9   18   2   24   2000   3380   Wh.   44   Own   4 Ver.   43/545		Mobile Tractor Co., Mobile, Ala.														
Nichola & Shepard Co., Battle Creek. Mich.   Ol-Cas., 25-50.   25   50   6   22 x 82   10000   Wh.   69   Own   2 Hor.   Ol-Cas., 35-70.   35 70   Service   Service							24	2000	3380							
Oliver Tractor Co., Knoxville, Tenn.																400-450
Oliver Tractor Co., Konxillo, Tenn.		Nichols & Shepard Co., Battle Creek. Mich														350-425
Parrett Tractor Co., Chicago Heights, III		Oliver Tractor Co. Knoxville, Tenn	1								W II.					900
Perrist Tractor Corp., Peoria, III.   Peoria J.   12   25   3   26   3000   5100   1,985   Wh.   56   560	-										Wh.	60				1000
Finneer Tractor Co., Winnan, Minn	- 1		Parrett, K	15	30	3			5250							1000
Fineer, 30.							1				Wh.					800
Plow Man Tractor Co. Waterloo, Ia.	1	Pioneer Tractor Co., Winona, Minn	16	1												750 650
Pepe Mfg. Co., Watertown, S. D.   Dakota, 4.   15   27   3   24   2000   3700   1,750   Wh.   42   Doman   4 Ver.   4\frac{1}{2}\tau \frac{1}{2}\tau \frac{1}\tau \frac{1}{2}\tau \frac{1}{2	- 1	Plow Men Tractor Co. Waterloo Is														1000
Post Tractor Co., Cleveland																800
Reed Fdy. & Mach. Co., Kalamasoo, Mich.   One-Man.   12   25   3   22 x 24     5000   1,685   Wh.   60   Wauk.   4 Ver.   4 ½x5½   4		Post Tractor Co., Cleveland	Post, D		20	2										80)
Reed Fdy & Mach. Co., Kalamasoo, Mich   One-Man.   12   25   3   22 x 24   5000   1,685   Wh.   54   Wauk.   4 Ver.   4\frac{1}{2}\x55\x54     Rock Island Plow Co., Rock Island, Ill.   Heider, D.   9   16   2   20   1500   4000   Wh.   54   Wauk.   4 Ver.   4\frac{1}{2}\x55\x54     Heider, C.   12   20   2   24   200   6000   Wh.   57   Wauk.   4 Ver.   4\frac{1}{2}\x55\x54     Russell Junior.   12   24   2   18   2000   6200   Wh.   53   Wauk.   4 Ver.   4\frac{1}{2}\x55\x54     Russell Big Boss.   20   35   4   3000   6900   Wh.   53   Wauk.   4 Ver.   4\frac{1}{2}\x55\x54     Russell Big Boss.   20   35   4   3000   6900   Wh.   53   Wauk.   4 Ver.   4\frac{1}{2}\x55\x54     Russell Giant.   30   60   8   40   6000   24000   Wh.   60   Model   4 Ver.   5\x52\x54     Samson Tractor Co., Janesville, Wis.   Samson, D.   1   1   1   1   1     Samson, M.   2   20 x 32   840   Wh.   60   Model   4 Ver.   3\frac{1}{2}\x55     Shelby Trac, & Tr. Co., Minneapolis, Minn.   Shawnee.   9   18   2   22   2100   3800   Wh.   60   Gray   4 Ver.   3\frac{1}{2}\x55     Shelby Trac, & Tr. Co., Shelty, Ohio.   Shelby, C.   9   18   2   22   3500   Wh.   60   Gray   4 Ver.   3\frac{1}{2}\x55     Short Turn Tractor Co., Minneapolis, Minn.   Short Turn, D.   20   40   3   24   5000   1,500   Wh.   65   Wh.   4 Ver.   4\frac{1}{2}\x55     Stockton Tractor Co., Stockton, Cal.   Stockton, A.   8   16   2-3   20 x 34   1850   3150   1,255   Wh.   44   H.S.   4 Ver.   4\frac{1}{2}\x55     Stimon Tractor Co., Stockton, Cal.   Stockton, A.   8   16   2-3   20 x 34   1850   3150   1,255   Wh.   44   Ver.   4\frac{1}{2}\x55     Torgo Motor Co., Stockton, Cal.   Stockton, A.   8   16   2-3   20 x 34   1850   3150   1,255   Wh.   44   H.S.   4 Ver.   4\frac{1}{2}\x55     Torgo Motor Co., Stockton, Co., Mensaha, Wis.   Toro.   12   2-12   1000   2300   Wh.   40   Wh.   40   Ver.   4\frac{1}{2}\x55     User Trace Co., Cornwells, Pa.   Traylor, 6-12   6   12   1   1   1000   2300   Wh.   40   Ver.   4\frac{1}{2}\x55     User Trace Co., Green		Pt. Huron Eng. & T. Co., Pt. Huron, Mich	Port Huron, 12-25.	12	25	3	22 x 38	2250	5900		Wh.	56	Chief	4 Ver.	43/4×6	900
Rock Island Flow Co., Rock Island, Ill.   Heider, D.   9   16   2   20   1500   4000   Wh.   54   Wauk.   4 Ver.   4\frac{1}{2}\x53\frac{1}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}\x53\frac{1}{2}\x53\frac{1}{2}\x53\frac{1}\x53\frac{1}{2}\x53\f		Dood Edu & Mach Co Kalamana Mich	One-Men	19	95	2	99 - 94		5000	1 685	Wh	60	Wank.	4 Ver	41.6x53.4	1000
Heider, C																1000
Russell Junior.   12   24   2   18   2000   6200   Wh.   53   Wauk.   4 Ver.   4½x5½   4½x5½   4   3000   6900   Wh.   53   Wauk.   4 Ver.   4½x5½   4   4½x5½   4   4   4   4   4   4   4   4   4	- 1					11										
Russell Junior.   12   24   2   18   2000   6200   Wh.   53   Wauk.   4 Ver.   4\frac{1}{2}\sigma^{5}\sigma^{5}\sqrt{1}			Heider, C	12	20	2	24	2000	6000		Wh.	57	Wauk.	4 Ver.	412x631	900
Russell & Co., Massillon, Ohio.   Russell Little Boss.   15   30   3   24   3000   6900   Wh.   53   Wauk.   4 Ver.   4 ½x6½			(n 117 :	1.0			1	2000	2000		1771.	20	Wouls	4 Von	41/-537	1000
Russell Big Boss   20   35   4   30   4000   7600   Wh.   60   Model   4 Ver.   5 ½x7	- 1	Pussell & Co. Massillan Ohio		1	1					1						950
Russell Giant.   30   60   8   40   6000   24000     Wh.   84   Own   4 Ver.   8 x10		Lussell & Co., Massillon, Olio.		1			1									825
Samson, M.		,	Russell Giant					1				84	Own			525
Shaw Enochs Trac. Co., Minneapolis, Minn.   Shawnee   9   18   2   22   2100   3800     Wh.   60   Gray   4 Ver.   3½x5   4 Shelby Trac. & Tr. Co., Shelby, Ohio.   Shelby, C.   9   18   2   22   3500     Wh.   42   Wauk.   4 Ver.   3½x5   4 Shelby Trac. & Tr. Co., Shelby, Ohio.   Shelby, D.   15   30     4600     Wh.   48   Spec.     43½x6   34x6		Samson Tractor Co., Janesville, Wis														
Shelby Trac. & Tr. Co., Shelby, Ohio.   Shelby, C.   9   18   2   22   3500   Wh.   42   Wauk.   4 Ver.   33\( \)4x5\( \)5   Short Turn Tractor Co., Minneapolis, Minn.   Short Turn, D.   20   40   3   24   5000   1,500   Wh.   48   Spec.     4\( \)4x6\( \)5   Short Turn Tractor Co., Minneapolis, Minn.   Short Turn, D.   20   40   3   24   5000   1,500   Wh.   65     4 Ver.   4\( \)4x6\( \)5   Start Turn Tractor Co., Norfolk, Nebr.   Square Turn, A.   18   35   3   28   3200   7400     60   Clim.   4 Ver.   5 \( \)x6\( \)5   Start Turn Tractor Co., Stockton, Cal.   Stockton, A.   8   16   2-3   20 x 34   1850   3150   1,225   Wh.   44   H-S.   4 Ver.   3\( \)4x6\( \)5   Stinson Trac. Co., Superior, Wis.   Stinson, 4-E.   18   36   4   28 x 30   7100   Wh.   60   Beav.   4 Ver.   4\( \)4x6\( \)3   Topg-Stewart Trac. Co., Clintonville, Wis.   Topga, 3   15   27   3-4   4   950   Wh.   36   Wis.   4 Ver.   4\( \)4x6\( \)4   Topg-Stewart Trac. Co., Clintonville, Wis.   Topg-Stewart, B.   30   45   4-6   7600   7500   3,500   Wh.   42   Wauk.   4 Ver.   4\( \)4x6\( \)4   Toro Motor Co., Minneapolis, Minn.   Toro.   12   2-12   1000   2300   Wh.   42   Wauk.   4 Ver.   4\( \)4x6\( \)4   Toro Motor Co., Minneapolis, Minn.   Toro.   12   2-12   1000   2300   Wh.   42   Wauk.   4 Ver.   4\( \)4x6\( \)4   Turner Mfg. Co., Pt. Washington, Wis.   Simplicity.   14   25   3   24   2600   4300   1,695   Wh.   54   Buda   4 Ver.   4\( \)4x6\( \)5   Vim. Tractor Co., Greensburg, Ind.   Victory, 9-18.   9   18   2   20   1500   3300   1,385   Wh.   48   Gray   4 Ver.   4\( \)4x6\( \)5   Vim. Tractor Co., Schleisingerville, Wis.   Vim.   10   20   2-3   20   1800   3200   1,650   Wh.   48   Wauk.   4 Ver.   4\( \)4x5\( \)4   Wetmore, H. A., Sioux City, Ia.   Wetmore.   12   25   2   22   2000   1,485   Wh.   46   Wauk.   4 Ver.   4\( \)4x5\( \)4   Wetmore, H. A., Sioux City, Ia.   Wetmore.   12   25   2   22   2000   1,485   Wh.   46   Wauk.   4 Ver.   4\( \)4x5\( \)4   Wetmore, H. A., Sioux City, Ia.   Wetmore.   12		Cham French Tree Co. Minara lin Mi			10	-		9100	3000	840		60	Grav		31/6v5	1200
Short Turn Tractor Co., Minneapolis, Minn   Short Turn, D.   20   40   3   24   5000   1,500   Wh.   65     4 Ver.   4 \( \frac{3}{4}\) x6   Square Turn Tractor Co., Norfolk, Nebr.   Square Turn, A   18   35   3   28   3200   7400     60   Clim.   4 Ver.   4 \( \frac{3}{4}\) x6   Stockton Tractor Co., Stockton, Cal.   Stockton, A   8   16   2-3   20 x 34   1850   3150   1,225   Wh.   44   H-S.   4 Ver.   3 \( \frac{1}{2}\) x6   Stinson Trac. Co., Superior, Wis.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   60   Beav.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100     Wh.   36   Wis.   4 Ver.   4 \( \frac{1}{2}\) x6   Stockton, A.   Stinson, 4-E.   18   36   4   28 x 30     7100   .							1	2100								1000
Short Turn Tractor Co., Minneapolis, Minn. Short Turn, D. 20 40 3 24 5000 1,500 Wh. 65 4 Ver. 434x6  Square Turn Tractor Co., Norfolk, Nebr. Square Turn, A. 18 35 3 28 3200 7400 60 Clim. 4 Ver. 5 x61/2  Stockton Tractor Co., Stockton, Cal. Stockton, A. 8 16 2-3 20 x 34 1850 3150 1,225 Wh. 44 H-S. 4 Ver. 31/2x5  Stinson Trac. Co., Superior, Wis. Stinson, 4-E. 18 36 4 28 x 30 7100 Wh. 60 Beav. 4 Ver. 43/4x6  Tioga Mfg. Co., Philadelphia, Pa. Tioga, 3 15 27 3-4 4950 Wh. 36 Wis. 4 Ver. 41/2x6  Toro Motor Co., Minneapolis, Minn. Toro 12 2-12 1000 2300 Wh. 42 Le Roi 4 Ver. 31/2x44/2  Traylor Engrg. & Mfg. Co., Cornwells, Pa. Traylor, 6-12. 6 12 1 1700 815 Wh. 38 Le Roi 4 Ver. 31/2x41/2  Turner Mfg. Co., Pt. Washington, Wis. Simplicity. 14 25 3 24 2600 4300 1,695 Wh. 54 Buda 4 Ver. 41/4x51/2  U. S. Trac. & Machy. Co., Menasha, Wis. Uncle Sam, B-19 20 30 3 28 3000 4250 Wh. 50 Beav. 4 Ver. 43/2x5  Victory Tractor Co., Greensburg, Ind. Victory, 9-18. 9 18 2 20 1500 3300 1,385 Wh. 48 Gray 4 Ver. 31/2x5  Vim Tractor Co., Schleisingerville, Wis. Vim. 10 20 2-3 20 1500 3200 1,650 Wh. 48 Wauk. 4 Ver. 41/2x51/2  Wetmore, H. A., Sioux City, Ia. Wetmore. 12 25 2 22 2900 1,485 Wh. 46 Wauk. 4 Ver. 4 x55/4  Wetmore, H. A., Sioux City, Ia. Wetmore. 12 25 2 22 2900 1,485 Wh. 46 Wauk. 4 Ver. 4 x55/4  Wetmore, H. A., Sioux City, Ia. Wetmore. 12 25 2 22 2900 1,485 Wh. 46 Wauk. 4 Ver. 4 x55/4		, , , , , , , , , , , , , , , , , , , ,	Shelby, D	1							Wh.	48			43/4×6	1100
Square Turn Tractor Co., Norfolk, Nebr.   Square Turn, A.   18   35   3   28   3200   7400     60   Clim.   4 Ver.   5 x6 \		Short Turn Tractor Co., Minneapolis, Minn	Short Turn, D	20	40	3	24		5000	1,500	Wh.	65		4 Ver.	434x6	950
Stockton Tractor Co., Stockton, Cal.   Stockton, A.   8   16   2-3   20 x 34   1850   3150   1,225   Wh.   44   H-S.   4 Ver.   3½x5   4 Ver.   43½x6   4 Ver		Square Turn Tractor Co., Norfolk, Nebr.	Square Turn, A	18	35	3	28	3200	7400			60	Clim.	4 Ver.	5 x6½	850
Stinson Trac. Co., Superior, Wis  Stinson, 4-E  Sti							1		3150	1,225		44	H-S.	4 Ver.	3½x5	
Topp-Stewart Trac Co., Clintonville, Wis.   Topp-Stewart, B.   30   45   4-6     7600   7500   3,500   Wh.   42   Wauk.   4 Ver.   43\/4x63\/4												1				950
Toro Motor Co., Minneapolis, Minn																1000
Traylor Engrg. & Mfg. Co., Cornwells, Pa. Traylor, 6-12. 6 12 1		**		30		1				1.						1200
Turner Mfg. Co., Pt. Washington, Wis. Simplicity. 14 25 3 24 2600 4300 1,695 Wh. 54 Buda 4 Ver. 4½x5½ U. S. Trac. & Machy, Co., Menasha, Wis. Uncle Sam, B-19. 20 30 3 28 3000 4250 Wh. 50 Beav. 4 Ver. 4½x6 Victory Tractor Co., Greensburg, Ind. (Victory, 9-18. 9 18 2 20 1500 3300 1,385 Wh. 48 Gray 4 Ver. 3½x5 Vim Tractor Co., Schleisingerville, Wis. Vim. 10 20 2-3 20 1800 3200 1,650 Wh. 48 Wauk. 4 Ver. 4½x5½ Waterloo Gasoline Eng. Co., Waterloo, Ia. Waterloo Boy, N. 12 25 3 2000 5900 Wn. 52 Own 2 Hor. 6½x7 Wetmore, H. A., Sioux City, Ia. Wetmore. 12 25 2 22 2900 1,485 Wh. 46 Wauk. 4 Ver. 4 x5½4				6	1											1000
Victory Tractor Co., Greensburg, Ind.       Victory, 9-18.       9       18       2       20       1500       3300       1,385       Wh.       48       Gray       4 Ver.       3½x5         Victory, 15-30.       15       30       3       28       2500       3450       1,750       Wh.       48       Wauk.       4 Ver.       4½x5¾         Vim Tractor Co., Schleisingerville, Wis.       Vim.       10       20       2-3       20       1800       3200       1,650       Wh.       48       Wauk.       4 Ver.       3¾x5¼         Waterloo Gasoline Eng. Co., Waterloo, Ia.       Waterloo Boy, N.       12       25       3       2000       5900        Wn.       52       Own       2 Hor.       6½x7         Wetmore, H. A., Sioux City, Ia.       Wetmore.       12       25       2       22        2900       1,485       Wh.       46       Wauk.       4 Ver.       4 ½x5½			Simplicity	14	25	3	24	2600	4300		Wh.	54			41/4 x51/2	1000
Vim Tractor Co., Schleisingerville, Wis.     15     30     3     28     2500     3450     1,750     Wh.     48     Wauk.     4 Ver.     4½x5¾       Vim Tractor Co., Schleisingerville, Wis.     Vim.     10     20     2-3     20     1800     3200     1,650     Wh.     48     Wauk.     4 Ver.     3¾x5¼       Waterloo Gasoline Eng. Co., Waterloo, Ia.     Waterloo Boy, N.     12     25     3     2000     5900      Wn.     52     Own     2 Hor.     6½x7       Wetmore.     12     25     2     22      2900     1,485     Wh.     46     Wauk.     4 Vcr.     4 x5¾							1	1								900
Vim Tractor Co., Schleisingerville, Wis.     Vim.     10     20     2-3     20     1800     3200     1,650     Wh.     48     Wauk.     4 Ver.     334x514       Waterloo Gasoline Eng. Co., Waterloo, Ia.     Waterloo Boy, N.     12     25     3     2000     5900	1	Victory Tractor Co., Greensburg, Ind	I	1			1									1000
Waterloo Gasoline Eng. Co., Waterloo, Ia.       Waterloo Boy, N.       12       25       3		Vim Tractor Co., Schleisinverville, Wie					1									1050
Wetmore, H. A., Sioux City, Ia																750
Wisconsin Farm Trac. Co., Sauk City, Wis Wisconsin, E		Wetmore, H. A., Sioux City, Ia	Wetmore	12	25	2				1,485			1			960
(		Wisconsin Farm Trac. Co., Sauk City, Wis		16	30		28			1		52				800
Yuba Mfg. Co., Marysville, Calif.     Ball Thread.     12     20     3     3500     6750     2,945     Cr.     Wauk.     4 Ver.     4½x6¾       Ball Thread.     20     35     5-6     6000     10100     4,655     Cr.     Wis.     4 Ver.     5¾x7		Yuba Mfg. Co., Marysville, Calif					1			1						700

		One and	-			OICC									
146	Allis Chalmers Mfg. Co., Milwaukee, Wis	General Purpose	6	12	1-16		1000	2500	795	Wh.	48	Le Roi	4 Ver.	3½x4½	1000
147	Atlantic Mch. Mfg. Co., Cleveland, Ohio	Merry Garden		2				250	195		20		1 Ver.	-/ 0/ 2	900
148	Avery Co., Peoria, Ill	Avery, 5-10 B	5	10	2	22 x 32	800	2600		Wh.	38			3 x4	1200
149	THE PERSON NAMED IN THE PARTY OF THE PARTY O	Avery, 6-cyl	7	12		22 x 32		3150		Wh.	38		100	3 x4	1200
150	Beeman Tractor Co., Minneapolis, Minn	Beeman G.:	2	4	1-7		260	550	310	Wh.	25	Own	1 Ver.	31/2x41/2	850

R. F. M.

000 200

800 9-600 9-500

600 535

0-450 0-425 0-375 900 1000

1000 

900

1200 850

### and Their Technical Specifications

Fuel.	Make and size of carburetor	Make of air cleaner	Make of magneto	Make of clutch	Make of gearset	Type of gearset	Make of radiator	Make of bearings in transmission	Make of bearings in front axle	Make of bearings in rear axle	Belt pulley diameter	Belt pulley R. P. M.	Belt Speed F. P. M.	Speeds	Speed range M. P. H.	Recommended plowing speed	Final Drive	Drive	Furrow wheel
i-K	1/4-King.	Ben.	King.	Own	Own	Sel. Sl. G.	Perfex Modine	G. & H. Hyatt	Own Hyatt	Own Hyatt	13 14	1000 600	2400	2 2	2.43-3.75 2 <sup>1</sup> / <sub>2</sub> -3.4	2.43	S. G. S. G.	Op.	Yes Yes
K-D	1½-StromEns.	Ben.	Dixie Dixie	Twin Own	Foote	SI. G.	B. & L.	Own	Own		1214	625			134-4.1	25/8	Ch.		
K-D	-Own		K-W	Own		Sl. G.		Own	Own		18	575			21/4-27/8	27/8	Ch.		
K-D	-Own		K-W	Own		Sl. G		Own	Own		18	575			21/4-27/8	27/8	Ch.		
K	1½-Own	Ben.	K-W	Own	Covert	Sel.	McCord	Timk.	Hyatt	Hyatt	10	1000	2600	3	11/4-5	21/2	I. G.	In.	No
3	1 -Carter	Ben.	Dixie	Delt.	Own	Sel.	Eureka	Hyatt	Timk.	Gurney	10	1200	3100	2	21/4-4	3	S. G.	In.	Yes
2	-Scheb.	Ben.	Bosch	Own	Own	Sl. G.	Own				111/2	700		* 3.	21/2-31/2	3	S. G.		
-K	1½-Scheb.		K-W	Own	Own		Long	Hyatt			26	320		2 2	21/4-31/4	21/4	G.		
K	11/2-Scheb.		K-W	Own		Sel.	Long				26 32	350 275		1	214-3	21/4	G. G.		
K	2 -Scheb.		K-W	Own			Long Long				34	275		1	•	21/2	G.		
-K	2½-Scheb.	Don	K-W	Own Own	Own		Long	Hyatt	Hyatt	Hyatt	7x11	750	2600	1	2-23/4	21/2			Yes
2	1½-King. 1¼-King.	Ben.	Dixie	Own	Own	Sl. G.	Perfex	Hyatt	Timk.	Hyatt	18	475	2200	2	11/2-21/2	21/2	G.	In.	
K	1½-Strom.	Ben.	Dixie	Bier.	Own		S-J	Hyatt	Own	Own	12	900	2825	2	21/2-5	21/2	S. G.	In.	Yes
K	1½-Strom.	Ben.	Berl.	B. & B.	Own	Sl. G.	S-J	N. D.	N. D.	Opt.	14	700	2600	3	11/4-8	23/4	Worm		Yes
K	11/4-Holl.	Ben.	Bosch	B. & B.	Own	S1. G.	Modine	Hyatt	Own	Hyatt	16	650	2700	2	2.2-2.9	2.9	S. G.	In.	Yes
-K	1½-Holl.	Ben.	K-W	Own	Own	Sl. G.	Modine	Hyatt	Own	Hyatt	17	528	2350	2	2-2.75	234	S. G.	In.	
K	2 -King.		K-W	Own	Own	Sl. G.	Own	Own	Own	Own	20	600	3150	2	1.4-2	2	S. G.	Op.	*******
K	21/2-King.		K-W	Own	Own	SI. G.	Own	Own	Own	Own	23 23	535 535	200 3200	1	2 2	2 2	G. S.	Op.	
F	3 -King.		K-W	Own	Own	Sl. G.	Own Own	Own Opt.	Own Opt.	Own Opt.	8x12	999	3200	1	2	-	10.	Op.	*******
	-King.	Pon	Eise. Remy	B. & B. B. & B.	Spec. Own	Sl. G.	Modine	Hyatt.	Оре.	Hyatt	9			1	1/2-3	31/2	G.	In.	
	1½-Holl. -King.	Ben.	Dixie	Own	Own	Sl. G.	Perfex	Own	Own	Own	8x22			2	11/2-3	11/2-3	S. G.		
	21/2-King.		Wied.	Own	Own -	Sl. G.	Perfex	Own	Own	Own	9x24			1	2.1	2.1	S. G.		
	3 -King.		Wied.	Own	Own	Sl. G.	Perfex	Own	Own	Own	12x30			. 1	1.86	1.86	S. G.		
K	1½-Ben.	Ben.	Dixie		Own	Sl. G.	Modine	Hyatt		Hyatt	211/2	2600	450	2	134-212	21/2	S. G.		
7	11/4-King.	Own	Eise.	Own	Own	Sl. G.	Perfex		Hyatt	Hyatt	12	1000	3141	3	1.80-4	02/	I. G.	In.	
K	13/8-King.	Own	Eise.	Own	Own.	Sl. G.	Perfex	TT.:	Own	Own	12	1000	3100 2500	2 2	2.6-4.07	23/4	S. G.		Yes
1	1½-Ben.	Ben.	Eise.	Own	Nutt.	SI. G.	Eureka	Hyatt Timk.	Timk.	Timk.	14 14	650 750	2500	3	2½-4 1¾-4	21/2	I. G. S. G.		Yes
K	1½-King	Ben.	K-W	Own	Own	Sl. G.	S-J S-J	Own	Own	Own	1712	650		3	184-414	214	5. U.		
K	2 -King.	Ben.	K-W Dixie	Own Twin	Own Foote	Sl. G.	Perfex	Hyatt	Hyatt	Hyatt	14	590	2200	2	2-3	-72	I. G.	Op.	
-K	1¼-Strom. 1¼-Linga	Len. John.	K-W	Bier.	Own	Sl. G.	S-J	Own	Own	Own	14	800	2500	1	3	3	Ch.		Yes
K	-King.	Ben.	Split.	Own	Own		Perfex	Opt.	Timk.	Timk.	14	2500		2	3–3	3	G.		Yes
K	13/8-King.	Own	Eise.	Own	Own		Bremer	S. K. F.	Plain	Plain	14	650-	2380	7	13/6-4	2	S. G.	In.	Yes
								**		TT	141	1065	3900	01/01/		01/	n a		V
-K	11/4-Ben.	Ben.	Dixie	Bier.	Own	Sl. G.	Modine	Hyatt		Hyatt	141/2	2600	703	7	1-5	21/2 11/4	B. G. B. G.	In.	Yes
-K	1 -King.	Ben.	Dixie	Own		Fr.	Perfex	U. S.		Own	12	1000	2200	'	1-9	174	D. G.	Op.	Yes
-к	11/ Vinn	Don	Dixie	Own		Fr.	Perfex	U.S.		Own	14	400-	2200	7	1-5	214	B. G.	Op.	Yes
-V	11/4-King.	Ben.	Dixie	Own		ri.	1 Ullea				1	900	}	11					The state of the s
K	11/4-King.	Ben.	Bosch	Own	Cotta	Sl. G.					1212	915	3000	3	11/2-33/4	214	S. G.	Op.	
K	114-King.	Ben.	Dixie	Own	Cotta	Sl. G.					121/2	810	2850	3	11/2-33/4	214	S. G.	Op.	
K	11/2-King.	Ben.	Dixie	Own	Own	Sl. G.					121/2	840	2749	2	2.4-334	2.4	S. G.	Op.	
K	2 -King.	Ben.	Bosch	Own	Own	Sl. G.					24	525	3310	2	2-412	2	S. G.	Op.	
3									* * *,* * * * *		10	375		1 9					
i		D	D1	D 4 D	0	SI C	Todd	Fafnir		Hyatt	18	919	2600	2	2-3.1	3.1		In.	Yes
G	1 -Scheb.	Ben.	Berl. Dixie	B. & B. Full.	Own Full.	Sl. G. Sl. G.	Modine		Timk.	Timk.	10	850	2200	3	134-434		I. G.	In.	105
-K	1 -King. -King.	Ben. Ben.	Dixie	Fuil.	Foote	Sl. G.	uine				14	600		2	27.4				
-K	1½-Opt.	Opt.	Dixie		Own	Sel.	Splitex	Own	Own	Own	18	950	)	2	2-3	21/2-3	I. G.		Yes
	-/2											700	}						
								**	71	**		490	9600		01.4	01.	1.0		
-K	$1\frac{1}{2}$ -Strom.	Ben.	Dixie		Own	CII C	Modine	Hyatt	Hyatt	Hyatt	12	850	2669	1 2	21/2	21/2	I. G.	Tn	Yes
-D	1 -King.	Ben.	Berl.	Own	Own	SI. G.	Modine	Hyatt Hyatt	Own Hyatt	Hyatt Own	12 12	400 950	2985	2	2½-3½ 2½-3	$\frac{2\frac{1}{3}}{3}$	G. S. G.	In. In.	No Yes
K G	13/8-King.	D	Dixie	Own Twin	Own Own	Sl. G. Sel.	G. & O.	Gurney	Timk.	Opt.	12		2000	2	2.7-3.7	2.7	G.	In.	No
G	11/4-Strom. 11/2-Strom.	Ben. Ben.	Split. Eise.	B. & B.	Own	Sel.	Bremer	Hyatt	N. D.	N. D.	12	900	2600	3	13/4-41/2	21/2	I. G.		
G	1 -King.	Donald.	Eise.	Own	Own	St. G.	S. J.		Own .	Hyatt	8	1200	2600	2	1-31/2	21/2	G.	In.	No
G	-King.	Own	Dixie	B. & B.	Own	Sl. G.	G. & O.	Own	Own		8	1200	1000	1	312-5	31/2	B. G.		
-K	11/4-King.	Ben.	Dixie	Own	Own		Perfex	Hyatt	Own	Own	14	600	600	2-21/2	13/4-3	21/2			Yes
K	1½-Ben.	Ben.	Dixie	Twin	Nutt.	Sl. G.	Perfex	Timk.	Timk.	Timk.	11	900	2600	2.6-3.8	2-4	2.6	S. G.	In.	Yes
G	1 -Car.	Ben.	Berl.	B. & B.	Own	Sl. G.	James.	Schatz	Hyatt	Opt.	10	820	2650	2	134-414	21/2	S. G.		
G	11/4-Ben.	Ben.	Berl.	B. & B.	Own	Sl. G.	James.	Schatz	Hyatt	Opt.	10	1000	2600	2 2	134-4	21/2	S. G.	In	V-
i-K	-Ben.	Ben.	Simme	B. & B.	Own	Sl. G.	B. & W.	Gurney	Gurney	Hyatt Hyatt	10	1000 750	2300 2750	214-3	2½-3½ 2¼-3	21/3 21/4-3	I. G. I. G.	In. Opt	Yes Yes
K G	1½-Scheb.		Dixie	Own	Own	Sl. G. S. G.	Modine Ideal	Hyatt		Timk.	12	900	2100	3	2-5	33/8	I. G.	In.	Yes
K	11/ 84	Ron	Dixie Eise.	Full. B. & B.	Fuller Foote	S. G.	Perfex	Hyatt			16	600	2600	2	11/2-4	21/3	S. G.	In.	108
D	1½-Strom. 1¼-Ens.	Ben. Donald.	Bosch	B. & B.	Own	S. G.	Own	Hyatt		Hyatt	12	700	2200	3	1.5-4	2.08	B. P.		
D	-Strom.		Bosch	Para.	Own	S. G.	Own	Hyatt	1	Hyatt	10-14	1	1835	2	2.06-3.28	2.06	I.G.	1	

One and	Two-Horse	Tractors
Chie and	I WULLIOISC	Tactors

G	3/8-King.	Ben.		B. & B.	Cwn	Sl. G.	Own	Gurney	Own	Own	10	1000	2600	1	11/2-2.4	2.4			Yes	146
C			Evin.		Own	Sl. G.		Own		Own	6	200		1	11/4-21/4		S. G.			147
G-K	3/4-King.		K-W	110000000000000000000000000000000000000	Own	Sl. G.	Own	Hyatt	Own	Own	12	780	2450	3	11/2-41/4	21/8	S. G.	Op.		148
G-K	34-King.		K-W	Own	Own	Sl. G.	Own		Own	Hyait	12	780	2450	3	11/2-41/4	21/8	S. G.	Op.		149
G G-K G-K G	3/4-King.	Donald.	Heinze	Own	Own		S-J		None	None	41/2	850	900	1	3/4-3	2	G.		Yes	150

159 160 161

173

### Motor Age Monthly Guide to Tractors

Line Number	Manufacturer	Tractor and Model	Drawbar horsepower	Belt horsepower	Number plows recommended	Size separator recommended	Pounds pull drawbar	Weight	Price	Traction	Diameter drive wheels	Make of engine	No. and type of cylinder	Bore and stroke	Normal R. P. M.
151	Consolidated G. & Gas. Eng. Co., New York	Do-It-All	3	6	1			1000	405		24	Cwn	1 Ver.	4½x5	900
152	Elderfield Mechanics Co., Pt. Washington, N. Y.	Universal, 20	1	4	1		250	750	450		36	Own	1 Ver.	3½x5	1000
153	Indiana Silo Co., Anderson, Ind	Indiana	5	10	1		900	2000		Wh.	50	Le Roi	4 Ver.	31/8x41/2	950
154	La Crosse, Trac. Co., La Crosse, Wis	La Crosse, M	7	12	1-16	18	1000	2600	750	Wh.	48	Own	2 Hor.	4 x6	1000
155	Market Garden Trac. Co., Minneapolis, Minn	Market	2	41/2	1-7			550			24	Veer	1 Hor.	4 x4	850
156	Midwest Engine Co., Indianapolis, Ind	Utilitor	11/2	31/2	1		150-200	750	380	Wh.	2434	Own	1 Ver.	3½x4½	1200
157	New Britian Mch. Co., New Britain, Conn	New Britain, 1	3	6	1-8		400	650	450	Wh.	261/2	Own	2 Ver.	2% x 4	1500
158	New Britain Mch. Co., New Britain, Conn	New Britain, 2	3	6	1-8		400	750	500	Wh.	32	Own	2 Ver.	23/4 x 4	1500
159	Oldsmar Tractor Co., Oldsmar, Fla	Oldsmar	1-3	5	1		150-450	1200	375	Wh.	32	Evin.	1 Ver.	5 x 5½	580
160	Scientific Farming Mehy., Minneapolis, Minn	Princess Pat	12	25	2	24 x 26	2000	3500	1,750	Wh.	46	Buda	4 Ver.	41/4 x 51/2	1000
161	Tillermobile Co., Minneapolis, Minn	Tiliermobiie, A	2	6	1-8			625	385	Wh.	30	Veer.	1 Ver.	4 x 4	1200
162	Toro Motor Co., Minneapolis, Minn	Toro	1	12	1	1	1100	2400	900	Wh.	42	Le Roi	4 Ver.	31/8 x 41/2	1200

### Motor Cultivators

													-		
163	Avery Co., Peoria, Ill	Avery, C				1		3450		Wh.	38	Cwn	4 Ver.	3 x4	1200
164	TELL TELL TELL TELL TELL TELL TELL TELL	Avery, 5-10	5	10				3050		Wh.	38	Own	4 Ver.	3 x4	1200
165	Bailor Plow Mfg. Co., Atchison, Kans	Bailor, A	6					2150	925	Wh.	44	Le Roi	4 Ver.	31/8 x 41/2	1000
166		Bailor, W	6					1800	775	Wh.	40	Le Roi	4 Ver.	31/8 x 41/2	1000
167	Detroit Culto-Tractor Corp., Detroit, Mich	Detroit Culte, AA	9	16	2	20 x 28	1600	1800	775	Wh.	42	Own	2 Ver.	4 x 6	400
168	Emerson-Brantingham Co., Rockford, Ill	E-B			None			3200		Wh.	42	Le Roi	4 Ver.	3½ x 4½	100
169	Parrett Motor Corp., Chicago	Parrett, J	6	12	2	none		3000	890	Wh.	44	Le Roi	4 Ver.	31/8 x 41/2	1000
170	Rock Island Plow Co., Rock Island, Ill	Heider, 10	6	10	1			2700		Wh.	46	Le Roi	4 Ver.	31/8 x 41/2	
171	Shaw Enochs Trac. Co., Minneapolis, Minn	Shawnee	6	12	1		1100	2600		Wh.	60	Le Roi	4 Ver.	31/8 x 41/2	1200
172		Shawnee	9	18	2	22	2100	3800		Wh.	60	Gray	4 Ver.	3½ x 5	1200
173	Toro Motor Co., Minneapolis, Minn	Toro		1		1	1100	2800	1	Wh.	42	Le Roi	4 Ver.	31/8 x 41/2	1200

Abbreviations: Traction—Wh., wheel; Cr., crawler. Engine—Beav., Beaver; Veer., Veerac; Herc., Hercules; Wauk, Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; Auto., Automatic; Weid., Weidely; Clim., Climax; Twin, Twin, City; Cont., Continental; Ruten, Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., Vertical; Hor., horizontal; Opp., opposed. Fuel—G, gasoline; K, kerosene; D, distillate. Carburetor—Ray., Rayfield; King, Kingston; Holl., Holley: Scheb, Schebler; Ben., Bennett; Web., Webster; Zeph., Zephyr; Ens., Ensign; Strom., Stromberg; Till., Tillotson, Enn., Bennett; Hol., Holley. Magneto—A-K., Atwater-Kent; Sum., Sumter; Eisee, Eiseman; Berl., Berling. Clutch—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; spec., special. Gearset—B. & S., Brown & Sharpe; Nutt., Nuttall. Gearset type—Sl. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding jaw clutch.

Final Drive—S. G., spur gear; Ch., chain; D. R., double reduction; B. G., bull gear.

Drive—Op., open; In., inclosed.

### Wonderful Times Ahead

(Concluded from page 35)

represent just so many heat units of liquid sunshine. But if you try to supply this country with alcohol made from corn, it would take four million square miles of territory and the people would have nothing to eat.

We are beginning to know how the sun works. Scientific people all over the world are beginning to learn how things are put together. We believe that it will be possible for us to utilize the power of the sun. One square mile of the Sahara desert has enough power beating down upon it every day, to run all of the industries in the state of Ohio for twenty-four hours. We know the time is coming when we can utilize this heat.

"It is only a question of a short time, until we can make gold and silver from iron and lead and other metals. A few years ago there were only a few people who believed that that was possible. They were considered crazy. That was back in the fifteenth and sixteenth centuries. To-day, the scientist or engineer who doesn't believe that the transmutation of metals is possible, is considered crazy. We know positively this will be done within the next year or so.

"There is nothing unnatural about it. All matter is built up of little atoms, which we might call bricks. We are learning how to pick them to pieces and rearrange them. Suppose you had a car-

load of bricks and on one corner you built a church and on the opposite corner a school. Then a storm came and wrecked them both. You could pick up these bricks and build another church and school but you wouldn't know which bricks were which. It is exactly the same proposition when you come to study the transmutation of metals.

"This is but one of the thousands of things which are in an embryo state. We are entering into a period, such as the world has never seen and, probably, will never see again. People in one line of work have given of their knowledge to people of another trade. These great problems which have been facing us for centuries are much nearer solution. The world is going ahead in the next twenty-five years, more than in any other period of history.

"Take the great human utility that upset the strategy of the Germans and made the war successful at such an early date. It was the ability of the Allies to move their troops so rapidly. This was due to the thousands of motor trucks, automobiles, tractors and tanks at their command. Here, again, the gasoline engine entered into the problem.

"No one can appreciate to what extent the motor trucks can be used, unless they see a situation such as the railroad strike in England last fall. When this trouble arose, they had it so well in hand it didn't amount to very much. Their success was due entirely to the enormous number of motor trucks and lorries and the excellent roads. Our roads have not yet been built so that this is possible here. When we do build them, we might just as well take care of ten and twelveton trucks as to make them adaptable to five tons. The larger the transportation units, the simpler the transportation problem becomes.

"The engineering profession is busy. We are on the lookout for things which will help the human race. There are so many things which must be perfected and developed. The whole world is crying for the things which we are producing and which we are trying to produce. Scarcity of materials and labor must be solved.

"This is the most wonderful country in the world. Any of us who have seen the conditions on the other side offer up a silent prayer of thanks every night that we are living in the United A most wonderful period is States. ahead of us. It is no time for lax thinking. Many of our problems are difficult. None of them are particularly serious. They must be met, as we have always met problems confronting us as a nation. Good judgment and common sense are just as effective to-day, as they ever were. Good judgment is going to carry us through, no matter how many people try to force a panic in the face of conditions as they are to-day."

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tic; line; tson eck; ary;

### and Their Technical Specifications

Line No.	Fuel	Make and size of carburetor	Make of air cleaner	Make of magneto	Make of clutch	Make of gearset	Type of gearset	Make of radiator	Make of bearings in transmission	Make of bearings in front axle	Make of bearings in rear axle	Belt pulley diameter	Belt pulley R. P. M.	Belt Speed F. P. M.	Speeds forward	Speed range M. P. H.	Recommended plowing speed	Final Drive	Drive	Furrow wheel	Line No
151	G	1 -Holl.	Donald.	Berl.	Cwn	Own		Own	Own	Own		6			1	1-3	21/2				151
152	G	₹8-Zen.		A-K	Own	Own		Main				6	1000		1	1-3	2	Worm			152
153	K	7/8-King.	Ben	A-K	Own	Own	Sl. G.	Cand.					1200		114-4			Ch.	Op.		153
154	K	11/4-King.	Ben.		Own	Own	Own	Hopper		Own	Own	10	1000	2600	1	134-21/2	21/2			Yes	154
155	G	1 -Scheb.	Ben.	Berl.	Own.	Own	Spec.		Hess-B.	Timk.		6	2000		1	11/2-21/2	21/2	Worm			. 155
156	G	3/4-King.	Own	Eise.	Own	Own		Modine				41/2	1200	1200	1	1-4	21/4	I. G.	In.		. 156
157	G	3/4-King.	Ben.	Dixie	Own	Own		G. & O.	Own			. 51/2	1500	2160	1	1-3		B. G.	In.		. 157
158	G	3/4-King.	Ben.	Dixie	Own	Own		G. & O.	Own			51/2	1500	2160	1	1-3		B. G.	In.		158
159	G	1 -Scheb.	Own	Opt.	Own			None	Own			5	580	240	21/2		21/2				. 159
160	K	11/4-Ben.	Martain	Dixie	B.&B.	Own	Sl. G.	S-J	Hyatt	Hyatt	Hyatt	12	1000	3100	2	21/2-41/2	21/2	I. G.	In.	Yes	160
161	G-K	-Verac	Own	Berl.	Own	Own	D. R.					11			1	1-3	21/2	B. G.			. 161
162	G	%-King.	Ben.	Eise.	Own	Own	Sl. G.	B.&W.	Opt.		Hvatt	8	1200	2400	1 2	1-31/2	31/2	B. G.	In.		. 162

### Motor Cultivators

163	G-K	3/4-King.	1	K-W	Own	Own	Sl. G.	Own	Hyatt	Own	Own	12	780	2450	3	11/2-41/4	21/8	S. G.	Op.		163
164	G-K	3/4-King.		K-W	Own	Own	Sl. G.	Own	Hyatt	Own	Hyatt	12	780	2450	3	11/2-41/4	21/8	S. G.	Op.		164
165	G	7/8-King.	Ben.	Dixie .	B.&B.			Perfex		Hyatt	Hyatt				2	21/2-3.7		Ch.			165
166	G	7/8-King.	Ben.	Dixie	B.&B.			Perfex		Hyatt	Hyatt				2	21/2-3.7		Ch.			166
107	G	11/4-Strom.	Own	Bosch	Own	Own	81. G.	Own	Hyatt	Own	Own	8	885	1800	2	1-3	21/8	B. G.	In.		167
168	G	-Holl.	Ben.	Dixie	Own	None	None	Perfex	Hyatt	Own	Hyatt	71/8	995		1-5	11/2-31/2	None				168
169	G	3/4-King.	Own	Eise.	B.& B.	Own	Sel.	Modine	S.K.F.	Hyatt	Hyatt	6	1000		2	1.3-3.5		I. G.		No	169
170	G	1/8-King.	Ben.	Dixie				Perfex	Opt.							11/2-31/2		B. G.	Op.		170
171	G	1-Scheb.	Ben.	Berl.	B. &.B.	Own	Sl. G.	Todd	Fafnir		Hyatt	8		2600	2	2-3.1	2 1		In.	Yes	171
172	G	1-Scheb.	Ben.	Berl.	B. & B.	Own	Sl. G.	Todd	Fafnir		Hyatt	8		2600	2	2-3.1	3.1		In.	Yes	172
173	G	7/8-King.	Ben.	E.&D.	Own	Own	Sl. G.	B.& W.	Opt.		Hyatt	8x6	1200	2400	2	1-31/6		B. G.	In.		173

Abbreviations: Traction—Wh., wheel; Cr., crawler. Engine—Beav., Beaver; Veer., Veerac; Herc., Hercules; Wauk., Waukesha; Buff., Buffalo; Asso., Associated Manufacturers; Auto., Automatic; Weid., Weidely; Clim., Climax; Twin, Twin City; Cont., Continental; Ruten, Rutenber; Over., Overland; Kenn., Kenneth. Cylinders—Ver., Vertical; Hor., horizontal; Opp., opposed. Fuel—G. gasoline; K, kerosene; D. distillate. Carburetor—Ray., Rayfield; King, Kingston; Holl., Holley; Scheb., Schebler; Ben., Bennett; Web., Webster; Zeph., Zephyr; Ens., Ensign; Strom., Stromberg; Till., Tillotson; Zen., Zentch; Car., Carter. Air-Cleaner—Donal., Donaldson: Ben., Bennett; Hol., Holley. Magneto—A-K., Atwater-Kent; Sum., Sumter; Eise., Eiseman; Berl., Berling. Clutch—B. & B., Borg & Beck; Bier., Bierman; Mun., Muncie; Rock., Rockwood; spec., special. Gaarset—B. & S., Brown & Sharpe; Nutt., Nuttall. Gearset type—St. G., sliding gear; Sel. G., selective gear; Fr., friction; Plan., planetary; Sl. J. C., sliding jaw clutch. Final Drive—S. G., spur gear; Ch., chain; D. R., double reduction; B. G., bull gear. Drive—Op., open; In., inclosed.

### The Dealer Equipped For Service Wins

(Concluded from page 14)

in any representations they might make and that he would stock repair parts and equip his service station with competent help and that whatever service was required to put the Celtrac across they might have.

The brothers went at the job and day by day they ride the territory giving demonstrations and visiting customers who have bought. Not a man in their territory who has a tractor that they do not see every few days and there never is any trouble they are not on the spot at once. Their policy is to satisfy the customer and as long as he can be satisfied and his tractor kept at work he is an active booster for the The result is that to-day the Hood River Garage is selling more Celtracs within its territory than are sold of all other makes of tractors combined.

These men have been selected to illustrate this story because each has been a conspicuous success, but each has sold a different make or type of tractor. The conditions surrounding each have been practically identical, so that no stronger proof could be given of the assertion that it is not the tractor but the dealer and his methods which make good.

It must be evident that in all these

cases it has been service which has put the business over. Not one of these dealers balked at the expense. Not one of these dealers stopped to consider his own interests before those of his customers, with the result that all have made money and will continue to make money. The thing which carried them past the overhead drag of excessive service is volume business, and this has come to them because they took care of their customers. It is the service in the tractor business that is the all important thing, and the man who balks because that is going to cost him something never will be a leader.

#### PHILADELPHIA DEALERS IN OUTING

Philadelphia, June 21—More than 200 members and friends of the Motor Truck association of Philadelphia, the Philadelphia Automobile Trade association, the Automobile Accessories Business association and the Camden Automobile Trade association participated in the annual outing of the Motor Truck association of Philadelphia, at Kugler's Mohican club, on the Delaware.

The picnickers assembled at the quarters of the Philadelphia Automobile Trade association, Broad and Callowhill streets and were conveyed in automo-

biles to Market Street ferry, where special boats carried them to Camden. There the caravan was met by the delegation of the Camden association and all then proceeded to the Mohican club. They were accompanied by a thirty-piece fife and drum corps on a motor truck, led by R. Arthur Bittong, chairman of the entertainment committee, who had provided a program of outdoor features.

The high light of the afternoon was the annual baseball game between the Camden trade association on the Philadelphia motor truck men.

An old-fashioned beefsteak dinner was served on the lawn in the evening and this was followed by a side-splitting vaudeville entertainment, for which Bittong also was largely responsible.

The return was made to Philadelphia also in caravan formation.

#### JOIN STATE MOTOR ASSOCIATION

Lincoln, Ill., June 20—At a meeting of the Logan County Automotive Dealers' association, the members voted to affiliate in a body with the recently organized Illinois Automotive Trade association. A membership drive, designed to reach every one engaged in the automotive or allied industries in Logan county, has been started and a large increase in membership is anticipated before the next meeting to be held July 12th.

# Trom the Tour Winds Climpses at the World of Motordom

### Coming Motor Events

#### AUTOMOBILE SHOWS

Indianapolis	Fall	Automobile	ShowSept.	6-11
Northampton,	MassAnnu	al Automob	ile ShowOct	. 6-8

#### FOREIGN SHOWS

Antwerp	Commercial Engines.		Tractors,		26-July	25
London	Commercial Passenger Ca	Vehicles,	Exhibition	, Olymp	Octob	er

#### RACES

Hanford, Cal. Dirt	Track	dy 4
Spokane, WashDirt	TrackJu	ily 4
	dway RaceJı	
	TrackJu	
	d Prix Race, Sporting Commission	
	TrackAt	
	TrackAt	
Johnstown City, PaDirt	TrackAt	ng. 21
	1 Race	
Middletown, N. Y Dirt	TrackAt	ıg. 20-21
	TrackAu	
Canandaigua, N. YDirt	TrackAu	ıg. 28
	TrackSe	
Uniontown, PaSpeed	dway RaceSe	pt. 6
	TrackSe	
Allentown, PaDirt	TrackSe	pt. 25

#### TOURS

Milwaukee, Wis
Lake Huron TourMichigan Pikes AssnJuly 4
New York-San FranciscoGlidden TourSeptember
Milwaukee, Wis

New York Bars One Arm Driving—One arm driving is now illegal in New York state. In city court here, Judge Frank W. Standart ruled that driving with one arm is reckless driving, even though the other arm may be used to hold a fair female more securely in her seat.

The court, after making its ruling, suspended sentence on Henry Smith of Lancaster, who was convicted of one armed driving while motoring along the Niagara Falls boulevard. A mounted officer noticed the zig-zag course of the machine and discovered, he claimed, the driver was protecting a lady companion with one arm.

Ohio License Plates Completed—The Ohio penitentiary has now completed the work of manufacturing the 1920 automobile and motorcycle license plates and Secretary of State Smith has been asked to submit a design for the 1921 tags, and it is planned to start manufacturing at once. A supply of steel for the 1921 tags will be contracted for soon.

Pennsylvania License Receipts—Automobile receipts of the State Highway Department up to May 4, were more than \$6,000,000, an increase of more than one million dollars for the entire year of 1919, according to announcement by the

automobile division of the department. For the corresponding period this year, 413,771 licenses were issued for passenger cars, which is 71,320 more than the total number issued during 1919. Receipts up to May 4 totaled \$6,127,864 and for last year, \$5,106,152. Licenses issued for motor trucks up to May 4, numbered 39,909, an increase of 7607 over the entire number issued last year.

Motor Trucks Relieve Freight Tie-Up-The traffic department of the Columbus Chamber of Commerce has taken an interest in the development of motor truck transportation as feeders for railroads and to relieve the freight congestion at the time of the switchmen's strike. When the switchmen's strike was first declared and the freight congestion developed, the Merchants' and Manufacturers' association of Columbus immediately took steps toward developing motor truck lines. Already a number of such lines were in operation and steps were taken to get other companies organized. One of the things which has worked against the idea in central Ohio is the bad condition of the roads. James G. Young, traffic manager for the Columbus Chamber of Commerce, as well as George M. Schwartz, believe that the only way to prevent similar freight congestions in the future is to encourage and develop motor truck transportation.

### Los Angeles Municipal Parking Grounds



Because of the great number of cars in Los Angeles, some means had to be devised to relieve the congestion caused by parking automobiles along the curb, so we have the Municipal Park for automobiles. It is laid out with individual space for each car



in

THE NATIONAL SEXTET SEVEN-PASSENGER TOURING

### The Secret of Sextet Style

The road-hugging lowness of the new National Sextet, which is the basis of Sextet beauty and the secret of Sextet style, has its genesis in a method of body mounting that is both original and unduplicated.

The custom-styled body of the National Sextet overlaps the chassis frame instead of sitting on top of it, as has been the common practice since automobiles were first built.

The exceptionally deep body sides are brought 31/8 inches closer to the ground. They descend, without a break, to within a scant two inches of the running board.

The high and ungainly running board apron, common to other makes of cars, is replaced by a trim and slender valance.

Thus, a smart, low-hung appearance, unmatched by any other American automobile, is gained without the sacrifice of road clearance or the acceptance of other compromises equally as undesirable.

This exclusively National method of body mounting, moreover, has practical as well as artistic advantages.

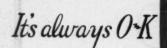
Broad timbers, known as sills, form the foundation of every automobile body. In other cars, these sills are laid flat. In the National Sextet, they are set on edge for trebled strength.

Thereby is afforded a support of unyielding rigidity that eliminates the "weave" which imposes heavy strains on body joints and causes the squeaks, rattles and other noises that develop under a method of body mounting less secure.

Arrow-straight lines, individual front fenders, a high and narrow radiator unmistakably National, and a flat upper body edge are only a few of the many striking style features.

NATIONAL MOTOR CAR & VEHICLE CORP., INDIANAPOLIS

Twentieth Successful Year



The immense increase in the demand for Batteries of every type, has made absolutely imperative an improvement and advance battery building. The O K Giant Battery is the proved product, under every conceivable test, to meet the situation which confronts the battery industry.

MERCHANTS ICE CO. of Harrisburg, Penna.

Chicago, Ills.

Harrishurg, Pa., Abril 5, 1990.

Giant

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and an convinced it will so or not an convinced it will strouble or nork without do other truly, anxiety yours very truly, c. E. DANNER.



No motorist would risk freezing his battery. It would be ruined almost beyond repair, if not altogether destroyed. The test as shown in the illustration was actually made with an O. K. Giant Battery on a friendly wager and to prove to a skeptic that the O. K. Giant Dry Rechargeable would function when frozen in a cake of ice-And it did. During the past three years, O. K. Giant Batteries have been subjected to every conceivable abuse to insure that they are "Fool Proof," and leading up to the time when our production would warrant the establishing of selling agencies and justify an announcement of such importance to the automobile world.

### Points of Superiority Which Are Startling

- 20 per cent more power
- Fires more intense spark
- More mileage per gallon of gas
- No corrosion
- No sulphation
- Will not heat up
- No repair bills

- No attention required
- Will not freeze
- No repairs
- No buckled plates 11
- 12 Fool proof
- 13 Battery troubles ended
- 14 Price the same
- TO BATTERY MEN .- If you can qualify as regards capital, experience and reputation, write, wire or long distance today for an appointment. Territory being snapped up every day.

O. K. GIANT BATTERY CORP.

Plant and General Offices Gary, Indiana

Selling agencies being established in important centers.

# ECU

## EQUIPMENT WILL RUN UP THE SHOP PROFITS

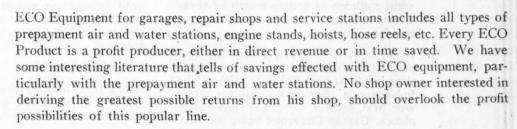


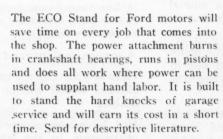
### Two-In-One Service Stands For Fords

Hold either power plant or rear axle, supporting the former at the same three points at which it is attached to the axle. They enable garages to handle Ford work much easier and more economically, and do away with makeshift methods. Power plant can be tested under its own power and all adjustments can be made before returning the plant to the car.

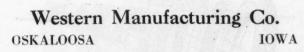


### Time Saved, Service Improved, Larger Returns





ECO Air Stations are coin operated, and insure high class service to the motor trade. Save time of attendants and pay for the expense usually involved in hose and compressor upkeep. The income is often large enough to pay light bills and other miscellaneous expense items. Send for descriptive literature.







The Big Three at Indianapolis—Gaston Chevrolet, driver; Barney Oldfield, tirebuilder: Louis Chevrolet, engineer.

### PROVING UP

### By Barney Oldfield

A year ago I told Tire Merchants that Oldfield Tires were the most trustworthy tires ever built.

Five thousand of them took my word

These 5,000 Merchants no longer judge my Tires by my recommendation alone, for they have sold, at a good profit, some millions of dollars worth of these Tires, and the Tires have made good the recommendation.

Now, as further proof, comes the record breaking performance of these tires in the annual 500 mile race at the Indianapolis Speedway, where they won first, second, third, sixth and eighth places, Gaston Chevrolet being the first winner in history to finish this annual battle of the tires without a change.

Nor was this one of those empty victories in which all cars carried the same tire equipment. Oldfields won out in a real battle, against cars representing four other tire manufacturers.

Tire buyers know these facts. They are hearing more about Oldfield Tires every day. And they are buying more Oldfield Tires.

So I come to you today with a story of tire quality, backed by the solidest kind of PROOF.

You can sell Oldfield Tires faster and more easily than any other tires on the market.

And I will have tires for you to sell, for I have held back this second invitation until production would enable me to take care of a limited number of merchants of the better type, who will accept it.

Sum it all up!

A big, good-looking tire with a history and a record—a tire with which you can defy any competition.

A live young company that has come faster than anything every did before in the tire industry.

A square deal, proved by performance.

Here is your chance to make a business alliance which will be lasting and profitable.

We have the most interesting sales proposition in the whole field of tire merchandising. Ask me for it.

You know me,

Damy Despiel





The Pacemaker at Indianapolis — Barney Oldfield — Master Driver, 1914; Master Tire Builder, 1920.

### MR. TIRE MERCHANT

### You Should Know That-

- -The Oldfield Tire Company was incorporated late in 1918.
- —The Company is a closed corporation with ample resources to insure its permanency and the fulfillment of all its undertakings.
- -It delivered its first tires in May 1919.
- —In its first year, it did a business running well into the millions.
- —Within that one year it has passed in sales more than 85% of the existing tire companies, many of which have been in operation for long periods of years.
- —Its growth has been more rapid than that of any other manufacturer in the history of the tire industry.
- -It is a tire company whose active head is nationally known as a practical tire

- specialist, student, and experimenter.
- The chief executive of the company is one of the few in the tire industry who has the courage to place his own name on the completed product.
- —Distribution of the Company's Tires is through a chain of warehouses, centrally located to give dealers prompt service.
- —Its sales plan offers the better Tire Merchant the most unusual and convincing advertising cooperation in the field of Tire merchandising.
- —It provides its sales connections with a complete line of wrapped-tread, twocured Tires—fabric and cord—as well as a full line of Truck Pneumatics, a special, high quality single-cured Tire in Ford sizes and at a very attractive price, and a complete stock of tire accessories.

### THE OLDFIELD TIRE CO.

BARNEY OLDFIELD

Warehouses

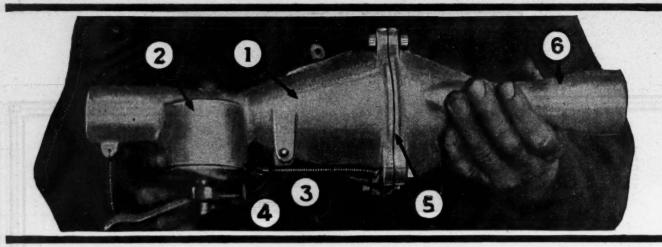
San Francisco

Los Angeles Dallas

Atlanta

Kansas City Chicago New York City





### Study These Six Points That Produced the Perfect Combined Muffler and Cut-out

A MUFFLER functions to silence and pass explosive gases. When it contends, as it must, with oil muck and carbon, one of two things happens.

The muffler gets tired and quits—a muffler blow-out.

Or chronic congestion sets in. Back pressure exacts its toll of power, of fuel and oil.

Hence the cut-out as a part of the Taber muffler. The Taber Cut-out is an integral part of the Taber Muffler. Its place on the Muffler is as natural as the nose on one's face. Neither would work well elsewhere.

There's over a score of patented exclusive features to commend the Taber Combined Muffler and Cut-out. To thousands of owners, the Taber has paid its cost in service—often many times over.

It won't rattle, clog nor blow out. It is self-cleaning. It lasts for the life of the car. Its action is as simple as it is dependable and instant. Nothing to get out of order. No upkeep or readjustments. Easily installed — Complete directions accompany each Taber.

FORD Model \$5.85. CHEVROLET (specify if wanted for 1920 car), MAXWELL and DODGE \$6.50. BUICK \$7.25 Complete. Higher West of the Rockies.

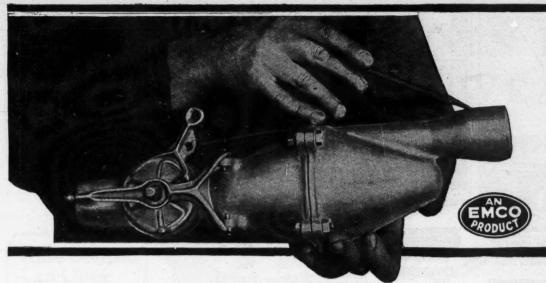
EMCO MANUFACTURING CO., Inc., Division of Consolidated Utilities Corporation. BINGHAMTON, N. Y.

- 1. Taber Muffler is solid casting of sturdy construction.
  Cannot rattle or blow out.
- 2. Taber Cut-Out. An integral part of Muffler.
- 3. Note self-cleaning, scissorlike plates of this patented port cut-out valve. It cannot clog.
- 4. Compensating pin balances all wear on only moving part of Taber. Keeps cut-out valve absolutely gas-tight.
- 5. Note tightness and strength of this seam. It makes an air and gas-tight joint.
- 6. Tail pipe puffs out expanded, cooled and silenced gases utterly spent and noiseless. Its inside walls are straight. Cannot choke or clog.

#### DEALERS

We offer you wide-awake co-operation. Wire a trial order today to prove how easy it is to sell the Taber. Please mention the Jobber with whom you prefer to do business.





"See the shape of that tail pipe? Its inside walls are straight. After the red hot explosive gas has gone thru the Taber and has been expanded, cooled and silenced this special tail pipe performs the last rite of slowing it down so that it puffs out into the open air in the form of spent gas—utterly lifeless and noiseless."

### Back Pressure Is Car Indigestion!

Acute when the muffler sounds its death rattle and blows out.

Chronic when the muffler cannot digest explosive gases, oil muck and carbon.

The symptoms are lazy car performance, excessive consumption of gasoline and oil. Back pressure adds to the high cost of motoring.

Thousands of owners consider themselves fortunate — they prescribed the Taber Combined Muffler and Cutout—it afforded instant relief.

Hear your motor roar like a racer and purr like a Packard! Know it is running sweet and clean! Let your engine deliver its rated power! Chase carbon clean to the open air! Cut down your fuel and oil costs!

The Taber does all that and it won't rattle, clog or blow out.

Because it's sturdily constructed, selfcleaning and permanently attached for the life of the car.

It is simple efficient, dependable at all times and requires no attention, readjustment or upkeep.

It costs but little. Complete directions make it an easy job to install. There's no substitute for a Taber—no other device possesses the many patented exclusive features that distinguish the Taber.

Ford Model \$5.25, Chevrolet (Specify if wanted for 1920 car), Maxwell and Buick \$7.25, Dodge \$6.50

Higher West of the Rockies.

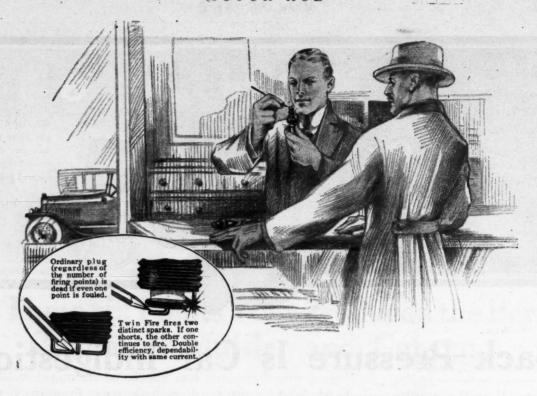
### **DEALERS**

This is the liveliest proposition you ever handled. The sort of co-operation we give will make sales sizzle. Wire a sample order today, or, if you prefer, write. Please mention the jobber through whom you send most of your orders.

EMCO MANUFACTURING CO., Inc., Binghamton, N. Y.

Division of Consolidated Utilities Corporation.





### Let Him Show You How

### Spark Plug Troubles Are Overcome

Stop at your accessory dealer's place today and ask him to show you the Twin Fire Spark Plug—the plug that fires twin sparks.

Ask him to lay a Twin Fire on a spark plug tester and prove to you that the Twin Fire does fire two separate and double intense sparks—and that if dirt, oil or carbon should clog one point—the other point continues to fire and ignite the gasoline.

DEALERS.
Write today for our liberal offer.

### Twin Fires Are Efficient With Present Low-Test Gasoline

The twin sparks of Twin Fire are not only doubly dependable—they also furnish the added heat which insures rapid combustion of low-test gasoline. You need Twin Fire efficiency and you can enjoy freedom from spark plug troubles by equipping your motor with a complete set. Twin Fires cost no more than ordinary type plugs, so why not enjoy the superior service which they give?

SALESMEN.

Here's an accessory of merit for you to handle on a commission basis.

TWIN FIRE SPARK PLUG CO.

722 Grand River Avenue

DETROIT, MICH.

# TUIN FIRE



Selling EVEN FASTER
As HOT WEATHER

Chamber
Approaches

The Juelson Two-Bladed Fan Keeps Fords Cool

It met with instant approval because of the long wanted relief from over-heating among Ford owners.

Sales have been large and constantly growing. But they'll grow even faster now. Because with the approach of warm weather the old Ford bugaboo of over-heating claims more and more attention.

This is your opportunity as a dealer. Show your Ford-owning customers how they can keep their cars from overheating by simply having a Juelson Fan installed at an expense of only \$1.60 and you will have started a business that will grow of its own accord as the mercury rises.

Not only that but it will be the nucleus of a profitable all-year-round business because, as you know, Ford overheating is not limited to summer.

Study the illustration above. It points out, quickly, the outstanding superiorities of the Juelson Two-Bladed Fan. Because of the peculiar aeroplane-type shape of blades, the Juelson pulls more air through the radiator. That keeps the cooling system working at top notch efficiency. Hot weather is conquered by its greater supply of air.

With two blades instead of four the Ford timer is perfectly accessible for cleaning and oiling when the regular Ford fan is replaced with a Juelson.

Exact replacement for regular Ford Fan. Easily and quickly installed.

For sale by leading jobbers and dealers everywhere. A live—quick-selling item that should be represented in your line.

THE AMERICAN AERO COMPANY, South Bend, Indiana

JESO Bloded FA



### Here's One Transmission Lining that Will Give Outstanding Satisfaction

When you put in Powers Norwegian Transmission Lining or sell it to a car owner, you can safely figure that you've made a friend. With Powers Norwegian on his car, Mr. Ford-owner is bound to experience such a freedom from transmission troubles that he'll thank your good judgment and think kindly of you "next time."

### Powers Norwegian Transmission Lining

is unlike other brake linings—and it's better. The basic material is selected long fibre cotton—the matchless Norwegian weave insures a uniform texture that is amply substantial yet soft and pliable. This superior fabric is treated with a special compound which renders it immune against oil, grease, water, gasoline, heat and dirt. The completed Transmission Lining can be worn thin as a sheet of paper without raveling or

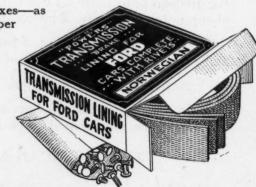
glazing—its grip is remarkable and it far outlasts ordinary linings.

Where Powers Norwegian Transmission Lining is used, all chatter is eliminated—jerky, jumpy, uncertain starting and stopping is done away with. When the brake is applied, there's always a smooth, sure-silent stop. And as there is no wire in Powers Norwegian, it can't injure the magneto.

Powers Norwegian Transmission Lining is packed in boxes—as shown here—each box containing three pieces of the proper length with necessary rivets for attaching. It can also be had in 100 ft, rolls.

POWERS PRODUCTS
MAKE MONEY FOR
DEALERS AND JOBBERS

This wonderfully efficient Transmission Lining is but one of many snappy sellers listed in the Powers Catalog of automotive specialties. If you haven't a copy, write for one (and trade prices) today.



The Powers Manufacturing Company

WATERLOO, IOWA

### Spirit

The mysterious power of money and the marvels of machinery in their influence upon the progress of the world will always pale into insignificance in the brilliant light of the magic spirit of willing men.

You might possess all the wealth of the world and all the machinery in Christendom, and yet be poor indeed if you lacked association with men who know the joy of honest united effort.

Happy is that organization which is dominated by the spirit of serving others, and this spirit, expressed by men who have joy in working and sharing with one another, commands rewards in personal satisfaction and happiness which exceed in value the money for which it will ever serve as a powerful magnet.



# JORDAN

MOTOR CAR CO., INC., CLEVELAND, OHIO

The spirit of an organization, like the spirit of a nation is not a thing created by law, defined to the letter and safeguarded by legal contract.

It consists of that magic something in the way of understanding which grows up between men who in their relations with one another are dominated by a spirit of charity toward the failings of others and actuated by a spirit of helpfulness in their efforts to serve.





Because the manufacturers have been many years in the business of making a quality line of textile

Because, with typical New England conscience, they have not permitted a single one of the products to leave their factory until thoroughly tried out, and the most severe conditions met.

Because their customers are numbered by thousands, and their markets are world wide.

Because the line as a whole is reliable, and backed up with an unconditional guarantee, and every car owner who is sold on "quality" will appreciate the chance to use it. It means that the element of chance, so often met in unreliable cleaners, dies and supplies, is removed.

Dealers: The motorist interested in the efficiency and appearance of his car will want "Be-Be-Co" products when he knows they can be procured in his neighborhood. Stock them. They pay a liberal profit. Write us for information.

> Boston Blacking Company Cambridge, Mass.

### The Be-Be-Co Line

Tar Remover. Carbon Remover. Patching Cement. Cushion Dressing. **Vulcanizing Cement.** Top Lining Dye. Mohair Top Dressing. Leather Top Dressing. Body Cleaner and Polish. O-So-Easy Hand Soap.

### PRICES

1½ Ton Standard \$3100

Ton 144 in. Wheelbase 3800 2½ Ton Standard

umatic equipment for both models in interest an advance in price

### Specifications

Modine Spirex Sectional Radiator
Timken-Detroit Front Axle
Buda Motor
Atwater-Kent Distributor
M & E Multiple Dry Disc

Clutch
Cotta Transmission
Cotta Control
Ross Steering Gest
Spieer Universal Joints
Timken-David Brown Worm
Drive Rear Axle, with
Hotchkies Drive
Mather Springs
Parish & Bingham Frame
Dayton Cast Steel Wheels
Firestone Tires

### Special Standard Equipment

CHORT now a half million freight cars and unable to move normal traffic because of strikes and bad weather, how can the railroads cope with fall's peak loads of grain, coal and other products requiring extra tens of thousands of cars?

They can't! Motor trucks must carry the burden of fall's industrial tonnage.

Trucks must both get the raw materials and deliver the finished products. Long hauls as well as short hauls will require trucks.

Manufacturers who plan now to use trucks will have them when needed and their goods will continue to move when those of competitors are tied up in warehouses and terminals.



# peak loads

The impending transportation emergency presents an opportunity to dealers in Ace Motor Trucks such as they have never before known.

For unless trucks keep industrial tonnage moving it won't move!

Dealers can relieve the situation by offering Ace completely equipped trucks to business houses now on the basis of immediate delivery. Grasp your opportunity by getting in touch with us at once.

The American Motor Truck Co. Newark, Ohio MOTOR TRUCKS
IMMEDIATE
DELIVERY



MAMERICAN MOTOR TRUCK COMPANY

### Assortment "D"

Takes care of all types of cars. The 100% Fan Belt Assortment.

### Gates Vulco-Cord Flat Endless Belts

No.	811	10	No. 828	4
No.	812	28	No. 831	8
No.	821	4	No. 832	4
No.	822	5	No. 834	5
No.	823	2	No. 835	8
No.	824	2	No. 836	2
No.	825	2	No. 837	4
No.	826	2	No. 842	3
No.	827	4	No. 912	3

100

### Gates Vulco-Cord Molded V Belts

No.	701	4	No.	706	4
No.	702	7	No.	707	6
No.	703	10	No.	708	16
No.	704	2			
No.	705	1			50

### Gates Vulco-Cord Laminated V Belting

50 ft. 5/8 in. 25 ft. 3/4 in.

### Gates Vulco-Cord Flat Belting

15 ft. 3/4 in. 50 ft. 1 in. 25 ft. 11/4 in.

Assortments "E" and "F" are also 100 per cent complete, but are smaller than assortment "D." Order to suit your trade.

Have you received your copy of our "Fourth Annual Official Fan Belt Guide?" It's 100 per cent complete for 1920. You cannot afford to be without it. We will gladly send you one free on request.

# GATES VILLED

FLAT and V-SHAPE

# These Quick-Selling Fan Belts are Just Like Money in the Bank

Millions of belts are being bought this summer by motorists as their old or factory-equipped belts begin to wear or fail to work properly.

Every car, truck and tractor in your community means a possible sale of one or more belts for you right away because the hot days with their engine-heating problems are already here.

GATES VULCO-CORD FAN BELTS are so widely advertised—their proven record for long, dependable performance is so well known to motorists—that it requires very little effort on your part to sell them.

Therefore you can stock one of our carefully selected Belt Assortments with complete confidence that the belts will promptly turn themselves into money for you and bring you a handsome profit.

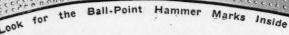
They are staple merchandise—merchandise that you can safely stock in large quantities without tying up your capital for too long a time. GATES VULCO-CORD FAN BELTS are just like cash in the bank because they sell quickly and you get your investment in them back at once—with a whole lot of clear gain besides.

Our different size assortments are based on a thorough analysis of the total number of the various makes and models of cars, trucks and tractors now in daily use and their average belt replacement requirements. No slow sellers nor non-salable items included.

Tell your jobber to ship you a GATES Assortment to suit your trade and get 100 per cent of the fan felt business for your store.

GATES RUBBER COMPANY
Denver, Colorado





# American Hammered Piston Rings

OVER 7,500,000 automobiles and trucks are now officially registered in the United States. This means about 112,500,000 rings will be replaced during the current year.

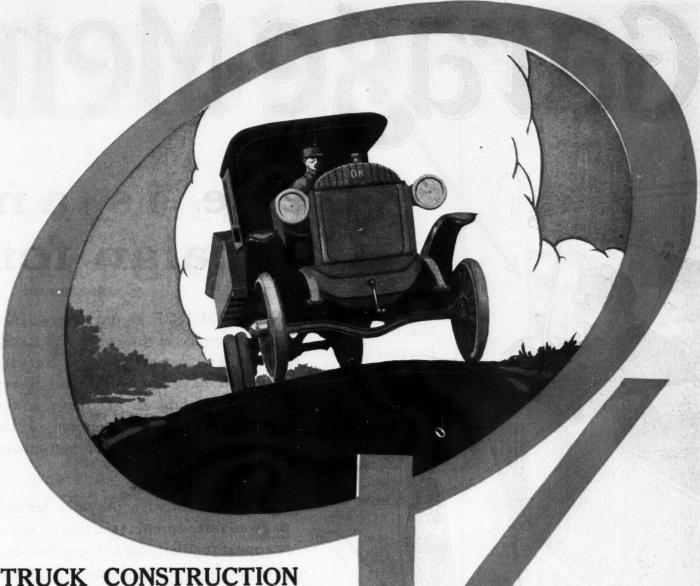
Thousands of dealers and garages have increased their piston ring replacement business this season, and their own profits, by handling American Hammered Piston Rings.

One piece—leakless—concentric.

Our dealer proposition is a generous one—ask your jobber.

AMERICAN HAMMERED PISTON RING CO.

Baltimore, Md.



TRUCK CONSTRUCTION

TRUCK DURABILITY

TRUCK SERVICE

The Superlative of All These Qualities is in the

### K. TRUCK

Note especially the heavy, pressed steel frame, much deeper and wider than that found in other trucks. This heavy frame, reinforced by 5 cross members, is a special feature of the O. K., adding tremendously to its strength and durability.

Out in the Oklahoma Oil Fields where trucks receive the most rigid tests, the O. K. has proved its merit. Practically every O. K. Truck built during our first two years is in active operation today, and giving the most satisfactory service.

#### OKLAHOMA AUTO MANUFACTURING CO. Muskogee Oklahoma

Dealers are invited to investigate our attractive sales proposition. Handling the O. K. Truck in your territory will triple your business. Write or wire today.

### O. K. Service

We are in a position to make immediate delivery of Trucks and guarantee shipment of all parts within 24 hours after order is received.

# Garase-Men

# Here is an Campaign for

A S AN EVIDENCE of our appreciation of the patronage of the many thousands of Garages, Repair Shops, Service Stations, etc. which have our equipment in service, we are inauguarating an extensive advertising Campaign calling the attention of the motoring public to the advantages of patronizing the "Weaver-ized" shops.

This Campaign provides for full page advertisements (starting at once) to appear regularly for not less than one year, in five of the leading National motor publications, including the paper in which this announcement appears

The copy is prepared with a view to appealing primarially to the car owner, and each advertisement illustrates the advantages to him of having his work done with Weaver Garage and Shop Equipment.

We are confident this extensive publicity will result in a great deal of benefit for those who now have our Equipment in service, and we of course trust that it may incidentally be the means of inspiring the purchase of more Weaver Equipment.

WEAVER MANUF SPRINGFIELD.

11

e

# LOOKI

# Advertising Your Benefit.

A HANDSOME WINDOW TRANSFER SIGN, 8 x 10 inches in size, richly executed in three colors and of the design shown herewith will be furnished, free to any Garage, Service Station, etc. which is equipped with a fairly representative assortment of our Equipment.

This sign on your window will show the car owner (local or transient) that you are in positon to give him the efficient, up-to-date service which he sees continually illustrated and described in this series of full page advertisements which are being aimed directly at him.

There is nothing gaudy or offensive in this sign. It is artistic, attractive and refined and will add to, rather than detract from, the effectiveness of your window or door.

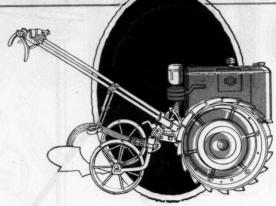
It will behoove you to have the Weaver Service sign on your window as soon as possible so as to enable you to reap the full benefit of this advertising which we are doing for you.

TO SECURE THIS SIGN simply clip the attached coupon, check the items of our equipment which you now have in service, fill in the name of your Jobber, attach to your letter-head or business card and mail in direct to us. Better do it TO-DAY.

ACTURING CO., ILLINOIS, U.S.A.







## What of the Future?

"Is my business able to weather economic 'storms' and low 'pressures' in buying?—

"Is my line as fully rounded-out as it should be?—

"Am I awake to the GREATER need today for FARM MOTIVE POWER than ever before?—

"Is there any TRIED and PROVED product that I can add to my present line that will sell because it WILL work satisfactorily, and because it is backed by the best of service programs?—"

These questions are "popping" into the minds of live dealers all over the country.

Preparing your business to meet "profit eating" conditions that may assail you requires thought, frankness, and a willingness to approach the subject from the other fellow's point of view—because in his plan there is apt to be the answer to your problem.

We all know the uncertainty of supply. Selling is easy because the demand is here. The big problem is "what can I do to offset my not getting as many trucks, cars, or tractors, as I need, because of the delivery situation? Is there something I can fill in with—THAT HAS A DEMAND—that I can get delivery on, when I'm short of my other lines?"

Our answer to you is YES.
You can get UTILITORS—if you act

DO YOU KNOW THE UTILITOR AND THE MARKET THAT EXISTS AT YOUR VERY DOOR FOR THIS FARM NECESSITY?

The Utilitor is a self-propelled power unit that competes with one horse or mule on the farm, truck garden, fruit orchard or wherever one horse or mule is used to till and cultivate the soil. Besides this, it is a power plant for any belt work requiring not more than three horse power; and it moves from job to job on its own power. But it is not built to do the work of a big tractor.

There are farms in your locality—large and small—where this machine will prove its worth. The size of the market for the Utilitor in your vicinity will surprise you.

From a mechanical standpoint, we point to the fact that the Midwest Engine Company for the past fifty years has built practically every known type of prime mover. We believe that we need go no further than to say that every UTILITOR is machined, assembled and tested with the same precise care that all Midwest products receive. Our limits of manufacture are very close; and the materials are selected with rigid and painstaking care.

But we realize that you must have even MORE convincing evidence of the Utilitor's ability than we alone can give you. When we say that the Utilitor competes with a horse or mule—we actually KNOW that it



## Dependable Product

does, and MORE—it works BETTER and at less EXPENSE.

There is one thing about the Utilitor that is of paramount importance today—especially to the man who does intensive cultivating—A UTILITOR DOES NOT EAT ANY PART OF WHAT IT PRODUCES.

You probably want just as convincing evidence of the practical side of selling the Utilitor as did hundreds of other dealers.

Regardless of our vast experimental work with the Utilitor these dealers, who saw FIRST, the market for this machine—and then the STRENGTH and BREADTH of our selling plan—found out for THEM-SELVES what the Utilitor would DO from the dealer's standpoint as a money maker.

For months these dealers have been conducting their own tests. It is conservatively estimated that in these tests some 4,000 acres of land in different parts of the country were used to CONVINCE these dealers that the Utilitor WOULD PLOW, CULTIVATE, SEED, MOW, and WORK UNCEASINGLY IF NEED BE ON THE BELT.

When this reaches you farmers will be preparing to CULTIVATE. This ONE use for the Utilitor alone is enough to NET YOU A GOOD PROFIT—and make many friends in the farm field.

We offer you an opportunity to fill out your line with the Utilitor. Our DIRECT

DEALER PLAN anticipates satisfactory PROFITS to you—and the FULLEST POSSIBLE COOPERATION.

The resources of this company are behind every Utilitor that goes into the field. Our service plan is the most complete and workable ever instituted.

It is impossible to outline here the sensibleness and feasibility of a UTILITOR DIRECT DEALER FRANCHISE. But we have prepared a SALES MANUAL THAT COVERS EVERY POINT OF THE MACHINE AND HOW TO SELL IT. We believe that one reading of this manual will prove to you that you can sell Utilitors with our HELP and show a profit.

Communicate with us NOW—while farmers are in need of this utility to increase cultivation. The Utilitor is a 365-day-a-year selling proposition because the Utilitor's usefulness, within its power range, is unlimited.

THERE'S A COPY OF OUR UTILITOR SALES MANUAL WAITING FOR YOU.

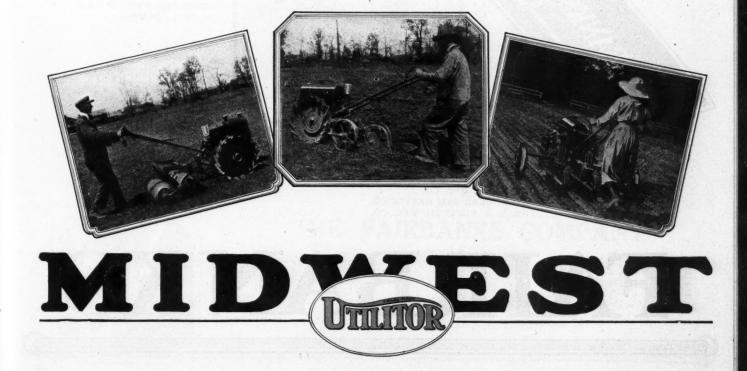
WRITE FOR IT TODAY.

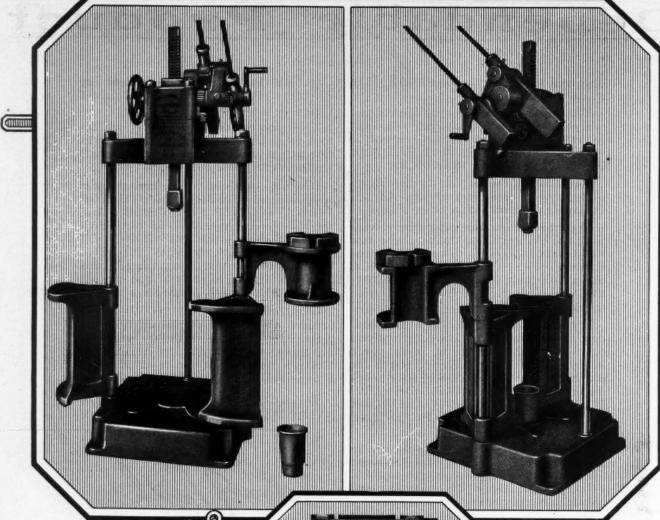
donf hmith

General Sales Manager.

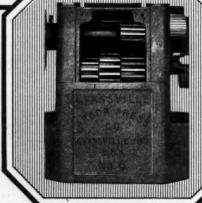
MIDWEST ENGINE COMPANY

INDIANAPOLIS, U. S. A.





Evansville Press and its Attachments



The Fairbanks Company is sole distributors for THE SERVICE STATION EQUIPMENT COMPANY THE HEMPY COOPER MFG. CO.

THE BILT RITE MFG. CO.

THE SERVISTOCK SYSTEM CORP. THE T. & T. MFG. CO.

THE DUPLEX RIM DEVICE CO.

THE. F. B. ELECTRIC MFG. CO.

When any attachment is in use it rests solidly on the bed plate

At left-These cut steel gears give the Evans-ville its enormous power

Fairbanks Scales Trucks & Wheelbarrows Valves Engines and Pumps Power Transmission
Mill, Mine & Railway
Supplies
Automobile Repair
Equipment Lincoln Electric Motors Steel Factory Equipment

FAIRBANKS

# ONE ARBOR PRESS THAT DOES THE WORK OF FIVE

THE Evansville Quadruple Compound Arbor Press is a combination of 4 to 5 sizes of regular arbor presses. It is light enough to do the fitting of the most delicate Speedometer, yet heavy enough to remove the most stubborn gears from the shaft. It combines all of the good features of the general "goose-neck" type of press and in addition includes:

An auxiliary lever for light fast work; ONE stroke of the lever will produce a 5/8 inch thrust of the ram. Two swinging tables which will accommodate work of any size or shape. Their eccentric pattern enables them to swing into position for any size mandrel-and also to swing to the left and right, out of the way, when not in use, -leaving the space clear between the ram and the base. An auxiliary table combined with a rotary face plate is also supplied which brings small or short work much nearer the ram.

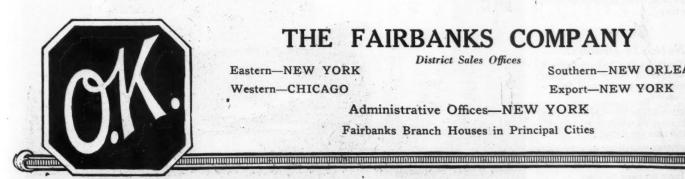
The framework-two 2 inch uprights -makes the press spring-proof and insures perfect alignment at all times. The ram is operated by two pinions on opposite sides distributing the strain

equally between the pinions. The other two sides of the ram are equipped with disc bearings, reducing friction to a minimum.

A second pawl on the gears eliminates entirely the backlash when the operator releases the lever for another stroke, thus retaining the maximum pressure developed in previous

These and many other features make the Evansville Quadruple Compound Arbor press the ideal press for service stations and repair shops. The quadruple compound gearing gives the press 4 times the power of the ordinary press employing compound leverage. The Evansville will develop a pressure of 30 tons at the ram. which will readily accommodate any work of the repair shop, such as broaching, removing and replacing of heavy bushings, and heavy straightening. The Evansville comes in two sizes. Send for literature and prices.

Fairbanks Automobile Repair Equipment is sold by representative jobbers, everywhere



### THE FAIRBANKS COMPANY

District Sales Offices

Eastern-NEW YORK

Western-CHICAGO

Southern-NEW ORLEANS

Export-NEW YORK

Administrative Offices-NEW YORK

Fairbanks Branch Houses in Principal Cities

### "Horse Sense"



To fill literature with unfamiliar words is like loading the reader's stomach with sand—humans have two digestive organs—mental and physical.



American autos are now going to 81 different countries, including Iceland, which last year bought 21 passenger cars and 2 motor trucks.



A Traffic Truck hauls a 4,000-lb. load 14 miles in one hour for 30c worth of gasoline and cuts in half the cost of hauling with teams.



The Traffic is the lowest priced 4,000-lb. capacity truck in the world. Built of standardized units.



The intelligent way of putting the cart before the horse — Traffic Trucks.



Traffic Specifications:

Red Seal Continental 3¾ x 5 motor; Covert transmission; multiple disc clutch; Bosch magneto; Carter carburetor; 4-piece cast shell, cellular type radiator; drop forged front axle with Timken roller bearings; Russel rear axle, internal gear, roller bearings; semi-elliptic front andrear springs; 6-inch U-channel frame; Standard Fisk tires, 34 x 3½ front, 34 x 5 rear; 133-inch wheelbase; 122-inch length of frame behind driver's seat; oil cup lubricating system; chassis painted, striped and varnished; driver's lazy-back seat and cushion regular equipment. Pneumatic cord tire equipment at extra cost. chassis \$1495 factory



Traffic Truck chassis equipped with cab, hoist, steel dump body (painted and varnished), no extras required, \$1990 complete, at factory.



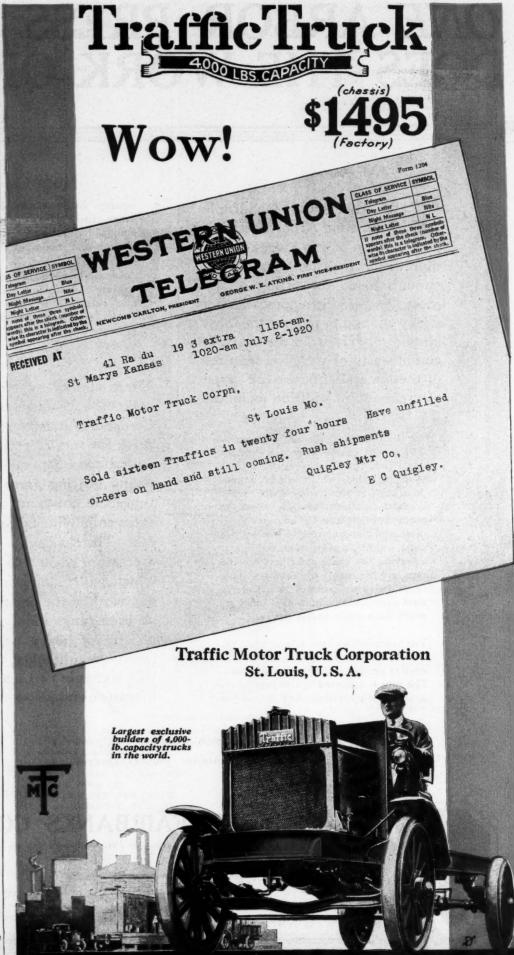
#### Notice to Dealers:

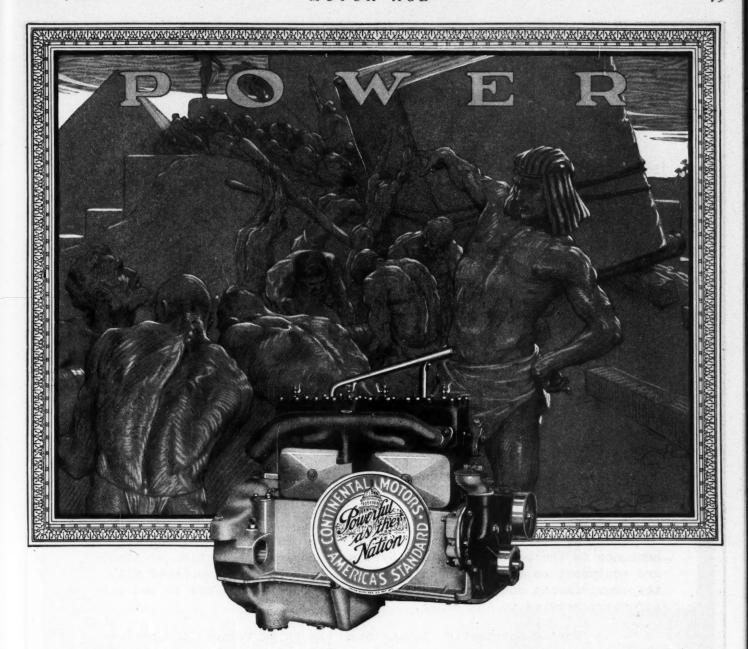
It is Traffic policy to make direct connections in every city, town and village in the United States and Canada

The demand for Traffics has made it necessary to quadruple the production this year.

Many dealers are getting in line now for future Traffic franchises.

You have no time to lose.





The struggle to produce a means of multiplying POWER has continued for ages. Each era has added its quota to the sum total of POWER knowledge and achievement. Few needs have ever been greater than those of supplying Energy for the requirements of the human race. The builder of power-creating mechanism today, therefore, is confronted with an enormous obligation. Upon him rests the responsi-

bility for the CONTINUED development of his product. The Continental Motors Corporation recognizes this obligation. It is manifested in the Continental organization and in the Continental product. It is one of the factors that guarantees to the manufacturer of Continental equipped cars and trucks and tractors, the MAINTENANCE of the quality standards that have always been associated with the Continental Red Seal.

### CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A.

Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World

# Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS



## An Open Letter

To the most progressive Automobile Engineer in America.

Dear Sir:

We address you because we feel <u>you</u> are the logical man to announce to the public the Dilso System of Spring Lubrication as standard equipment on the car in which you have, so far, incorporated all the improvements and refinements which make for the comfort of and satisfactory service to the owner.

Spring Lubrication is the next <u>big thing</u> towards the perfection of the motor car and truck and the Dilso System adds but a trifle to the cost of the springs--yet it means  $\underline{so}$  much to the owner.

Think of it--no spring squeaks--no rusted springs--no more complaints of a "hard riding" car and fewer broken springs.

Just a simple cup like recess at the end of each leaf with a felt pad to hold the free flowing oil which is carried to all frictional surfaces of the spring by capillary attraction—that's the <u>Dilso System of Spring Lubrication</u>.

Yours very truly,

### **Buxton & Owen**

Sole Licensors under the Dilley Patents to car manufacturers

30 North LaSalle St., CHICAGO



What Makes An Alloy Steel "Commercial"?

The tota cost of the finished product of the quaity required



Our book, "Molybdenum Commercial Steels" through the aid of photomicrographs, colored heat treatment charts and other data derived

from the commercial production and consumption of several score thousand tons of these steels, shows why they are termed "commercial."

Copies may be obtained by addressing

Climax Molybdenum Co.

or

The American Metal Co., Ltd.

61 Broadway, New York

# Molybelenni Steels

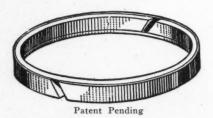
Easier to Heat Treat Easier to Machine Dynamically Tougher Resist Fatigue —

PROVEN IN WAR FOR THE TASKS OF PEACE

# One Way to Overcome Many Motor Troubles

Just Install the Right Piston Rings

The three-way seal action of Carbon-O Piston Rings exerts a smooth, steady pressure against the cylinder wall. The pressure is so steady and firm that no oil or power leaks past the ring, or under it through the ring groove.



Carbon-O's get this even pressure from being two-piece, bevelcut and overlapping. They are entirely devoid of stiffness of metal that scores and "bells" cylinder walls. They are cast of identically the same material as cylinder walls. This overcomes all possibility of scoring.



Have a Three-Way Seal

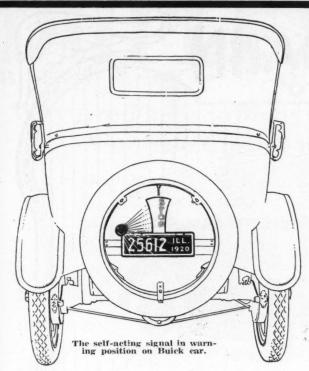
They Completely Seal a Worn Ring Groove

Look at A in the illustration and you will see how oil and compression leaks past the sides and under a worn ring-groove. Now look at C and D and see how the bevel-cut, overlapping Carbon-O's expand laterally to seal against the sides of a worn ring groove, as well as expand outwardly to seal against the sides of the cylinder wall.

Carbon-O Piston Rings Are Covered by a Generous Guarantee

Ask Your Jobber For Them.

Steam Tractor Auto & Mfg. Co.
219 W. 7th Street SIOUX CITY, IOWA



### **NEW** Automobile Signal **Operating Automatically** With Foot Pedal

THE BIGGEST

worth of accident prevention ever offered to car owners.

> The self-acting signal is designed with bright red embossed letters on a white semaphore (see center cut) neat and durably made.

> > Concealed within one inch space behind rear license plate when not in use. Fool proof and reliable.

lnexpensive, yet dependable and better than any other signal on the mar-

100% self-acting and requires no thought or deliberate action on the part of the driver in giving immediate and conspicuous warning to the man behind.

> Requires no operation of lever. switches or buttons to confuse driver in emergencies.



Patent Applied for.

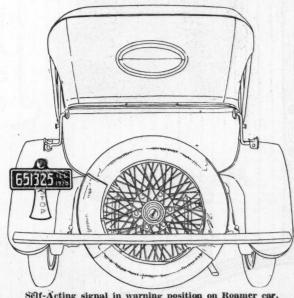
Can be attached to any car. Designed to operate either upward or downward. Illuminated at night by tail light.

### A low priced signal that will absolutely serve its purpose.

Very simple to install, no holes to drill, will fit all types of rear license brackets and is operated from either clutch or foot brake pedal.

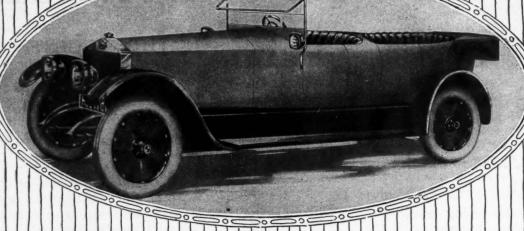
Your jobber can supply you, or order from us direct.

Chicago Automatic Signal Co. 56 West Randolph Street CHICAGO **ILLINOIS** 



Self-Acting signal in warning position on Roamer car.





We take pleasure in announcing that the

"Forster Six"
manufactured by
The Forster Motor Car
& Manufacturing Co., Ltd.,
Montreal, Canada
will use the Eisemann
high-tension waterproof
and dustproof Magneto
as factory equipment.



Magneto Ignition

EISE MANN
MAGNETO CORPORATION

PLANT and GENERAL OFFICES - 32 THIRTY-THIRD ST., BROOKLYN NY

# DUPLEX TRUCKS

Why Are There So Many "Slightly Used" Trucks Offered "For Sale Cheap" in Every City Every Day?

In One Day in Three Cities 324 Different Trucks Were Listed in the "Used Trucks For Sale" Columns—and Not One Duplex Among Them

Are These Trucks For Sale Because They Were Not Bought Right?

LOOK in the "used car" columns of your local paper and note the number of different trucks offered for sale.

Now most of these owners are not going back to horses and mules—but will buy and use other trucks.

That means a customer lost for the dealers who sold them the first truck.

. Have you ever stopped to analyze why there are so few Duplex Trucks for sale at second hand?

A motor truck dealer, like every other business man needs repeat customers.

There is not so much mystery about a motor truck as there used to be and mechanical "talking points" do not count for nearly so much as a record for practical economy.

Right there is the great appeal of the Duplex to business men and to the dealer.

Here are two trucks—one the famous Duplex 4-Wheel Drive Heavy Duty Truck and the other the wonderful medium capacity, *High Speed* Duplex Limited—and each is a real truck, built for business and the needs of American business.

With these two Duplex trucks the dealer is in position to fill the trucking needs of 85% of the business men in America.

Here is an enormous sales field—and the opportunity to build up an enduring business of constantly increasing size.

The public Good-Will for Duplex Trucks is one of the most valuable in the whole world—for this public recognition of Duplex economy and all around satisfaction has made this one of the oldest and most successful truck companies in America.

This is a wonderful Duplex year. Tell all your old customers about the Limited and go after all the trade in your community. The Limited fills a real need.

Now is the time to begin!

#### Duplex 4 - Wheel Drive

Many companies in the heavy duty fields say that the Duplex 4-Wheel Drive is the only successful truck they ever owned.

If your kind of work has proved too much for the ordinary truck—you will find that the Duplex dealer near you can give you some really interesting facts.

Many owners still seem to be using the wrong kind of trucks. Get the Duplex facts.



#### The Duplex Limited

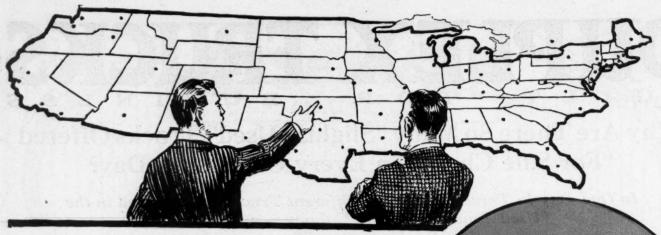
Thoughtful men have entire confidence in the Duplex Limited—feeling that this high speed Duplex is a safe investment because of the fact that it is a Duplex.

safe investment because of the fact that it is a Dupiex.

Medium capacity—Pneumatic Tired—Two Wheel
Drive—Full Electrical Equipment—here is a Speed
Truck that lasts. Strong, rugged, mechanically and
constructively right—it handles as easily and smoothly
as a passenger car—and at a minimum of upkeep.

# Duplex Truck Company Lansing Michigan

One of the Oldest and Most Successful Truck Companies in America



### Dealers, Order This Second Spare Tire Carrier From Your Jobber

For your convenience we show here the jobbers in your territory that carry the Erp Spare Rim Carrier in stock. This accessory has proven to be the fastest selling article that accessory dealers carry. If you are not stocking it ask your nearest jobber about its merits and selling possibilities.

#### SEDGWICK SALES CO. 1405 Sedgwick Ave., New York City

Sales Representatives and Distributors

Allied Industries, Inc. 283 Minna St., San Francisco, for California, Oregon, Idaho, Wash-ington, Nevada, Arizona.

Webber & Doyle, Inc.
153 Cabot St., Beverly, Mass., for
Maine, New Hampshire, Connecticut, Massachusetts, Vermont,
Rhode Island.

Wm. M. Moore Co., Inc.
Broad and Girard Ave., Philadelphia, Pa., for S. E. Pennsylvania and Southern New Jersey.

The Rubber Sales Co. 6353 West Jackson Blvd., Chicago, for Illinois, Indiana, Michigan, Wisconsin.

JORBERS

Moore-Handley, Birmingham.

Moore-Handley, Birmingham.

ARIZONA
Motor Supply Co., Phoenix.

ARKANSAS
Arkansas Automobile Appliance, Little Rock.

CALIFORNIA

Motor Hdw. & Eq. Co., San Diego.
Kimball-Upson Co., Sacramento.
Chanslor-Lyon Co., Los Angeles.
Bowman Auto Supply Co., Sacramento.
McCoy Motor Supply Co., San Francisco.

COLORADO
The B. K. Sweeney Electrical Co., Denver.
CONNECTICUT
The Post-Lester Co., Hartford.
Horton-Gallo-Creamer Co., New Haven.

FLORIDA
Patrick's Quick Tire Service, Inc., Jacksonville.
Knight & Wall, Tampa.
Consolidated Grocery Co., Jacksonville.

Consolidated Grocery Co., Jacksonville.

GEORGIA

Julian Priade Auto Supply Co., Atlanta.

ILLINOIS

Beckley-Ralston Co., Chicago.

Chicago Auto Supply House, Inc., Chicago.

Chicago Auto Eq. Co., Chicago.

Electric Appliance Co., Chicago.

SELLS FOR \$3.50 A SET ANY RIM OR TIRE



INDIANA
National Mill Supply Co., Ft. Wayne.

KENTUCKY
Harbison & Gathright Co., 707 W. Main St.,

Louisville. Harbison & Gathright Co., 707 W. Main Louisville.
Dickinson Bros., Glasgow.
LOUISIANA
Rapides Auto Supply Co., Alexandria.
MAINE
N. H. Bragg & Sons, Bangor.
MARYLAND
S. Lee George, Baltimore.
United Accessory Co., Cumberland.
MICHIGAN
Watkins & Radelifie, Detroit.
MINNESOTA
Farwell-Ozmun-Kirk Co., St. Paul.
MASSACHUSETTS
Motor Accessories Corp., Boston.
Wetmore-Savage Co., Boston.
Alsten & Goulding Co., Worcester.
Linscott Supply Co., Boston.
Butts & Ordway Co., Boston.
MISSOURI
Silgo Iron Store Co., St. Louis.
Equipment Co., Kansas City.
Ozark Motor & Supply Co., Springfield.
Faeth Iron Store Co., Kansas City.
MONTANA
Accessories Sales Co., Ellings

Ozark Motor & Supply Co., Springfield.
Faeth Iron Store Co., Kansas City.

MONTANA
Accessories Sales Co., Billings.

NEBRASKA
Nebraska-Buick Co., Lincoln.

NEW JERSEY
Elin Auto Supply Co., Newark.
Automotive Equipment Co., Inc., Newark.
Economy Auto Supply Co., Newark.

NEW YORK
Auto Hdw. & Equipment Co., New York.
Lowe Motor Supplies, New York.
Motor Car Equipment Co., New York.
J. B. Cohn & Co., New York.
C. Yewdall, New York.
Miller Auto Supply Co., New York.
National Motor Eq. Co., New York.
Direct Products Co., New York.
Lehr Auto Supply Co., New York.
Ryan & Hughes Co., New York.
Auto Rim & Parts Co., Inc., New York.
The Beckley-Ralston Co., New York.
Usawes Martin, New York.
Weaver-Ebling Automobile Co., New York.
Pyramid Motor Eq. Co., New York.
A. J. Picard & Co., New York.

Yorkville Auto Supply Co., New York.
Farrell Auto Supply Co., Brooklyn.
Martin-Evans Co., Brooklyn.
Ralph L. Krohn, Utica.
Perry and Sherman, Utica,
Perry and Sherman, Utica,
Rochester Auto Supply Co., Rochester.
Albany Hdw. & Iron Co., Albany.
John Van Benschoten, Poughkeepsie.
U. S. Rubber Co., Buffalo.
NORTH CAROLINA
Gregg Bros. Auto Accessory Co., Laurinsberg.
Automobile Supply Co., Wilmington.
OHIO
The Dine DeWees Co., Canton.
G. Schroyer & Co., Dayton.
OKLAHOMA

OKLAHOMA Sharp Auto Supply Co., Oklahoma City.

OREGON
Basche-Sage Hdw. Co., Baker.
PENNSYLVANIA
Consumer's Auto Supply Co., Pittsburgh.
American Auto Supply Co., Scranton.
E. F. Youse Co., Reading.

RHODE ISLAND

Belcher & Loomis Co., Providence.
Waite Auto Supply Co., Providence.
Goodby-Rankin Co., Providence.

TEXAS
The Andrews-McDonald Co., Amarillo.
Archenhold Automobile Co., Waco.
Bering-Cortes Hdw. Co., Houston.
Southern Equipment Co., San Antonio.

Salt Lake Hdw. Co., Salt Lake City.

Salt Lake Hdw. Co., Salt Lake City.

VIRGINIA

Norfolk Motor Eq. Co., Norfolk.

WASHINGTON

Dirks Motor Supply Co., Spokane.

Reynolds & Reynolds, Tacoma.

Seattle Hdw. Co., Seattle.

WEST VIRGINIA

T. T. Hutchisson Co., Wheeling.

DOMINION OF CANADA

Keyes Supply Co., Ottawa.

Bowman Bros., Ltd., Regina, Sask.

Alcock, Downing & Wright, Vancouver.

McLeenan, McFeely & Co., Vancouver.



# To Get the Miles Get the Gallons





The proprietor of a filling station in Beaumont, Texas, writes us that Guarantee Visible Pumps increased his gasolines sales 50% in three months. Similar reports come to us almost daily from all parts of the country.

The reason is not hard to find.

Motorists like to see that they are getting full measure — the Guarantee Visible assures that.

They like quick service—the Guarantee Visible assures that, too—one to five gallons perfectly filtered and plainly visi-

ble in the glass measure is only a matter of seconds.

As a result, customers come back again and again. They tell their friends, who, in turn gladly go out of their way to hunt up the Guarantee Visible station. With such influences at work sales just naturally pick up and keep right on growing.

growing.
But that is not all, the Guarantee Visible stops all leaks; every gallon of gasoline in your tank is accounted for.

Fully approved by the National Board of Fife Underwriters and now in successful operation in all states.

#### For catalog and full information address nearest Distributor.

GUARANTEE VISIBLE MEASURE SALES CO.—557 Munsey Building, Washington, D. C.

RUPERT COX EQUIPMENT CO.— 1927 Main Street, Kansas City, Mo.

RUPERT COX EQUIPMENT CO.—
1412 Commerce Street, Dallas,
Tex.

NATIONAL AUTO SUPPLY CO.— 108 West Third Street, Oklahoma City, Okla. GARAGE EQUIPMENT CO.— 809 Citizens Bank Building, Raleigh, N. C.

THE MOTOR SHOP—Capitol Boulevard, Nashville, Tenn.

RIX COMPRESSED AIR & DRILL CO.—505 Howard Street, San Francisco, Cal.

VISIBLE OIL PUMP CO.—1601 Harrison Street, Davenport, Iowa. DINE DEWEES CO.-400-410 Walnut Avenue, S. E., Canton, Ohio.

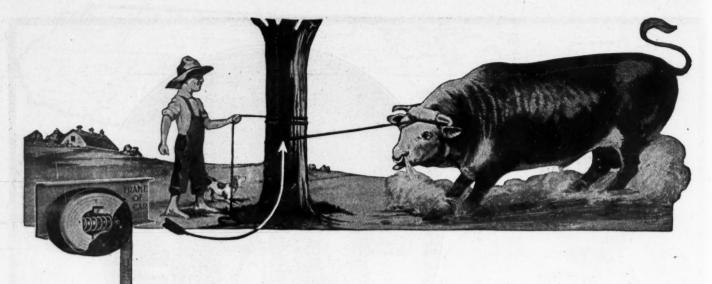
MR. DAN M. KERSHNER—1544 Court Place, Denver, Colo.

MR. J. W. LEA-Huntington, W.

NATIONAL OIL EQUIPMENT CO. -815 Hennepin Avenue, Minneapolis, Minn.

### GUARANTEE LIQUID MEASURE COMPANY

Rochester, Penna.



#### Over 30 Leading

cars including the following are either standard equipped with Gabriel Snubbers or have frames drilled for them at the factory.

Apperson Auburn Chalmers Chandler Cleveland Crow-Elkhart Essex Grant Haynes Hudson Jordan Kissel Kar Maibohm Nelson Oldsmobile Packard Peerless Pierce-Arrow Premier Scripps-Booth Stanley Studebaker

Westcott Willys-Knight

# Reduce Tire Expense!

Bouncing wheels place a great strain upon the tires—and grind off their treads.

Snubbers practically eliminate bouncing, whether the road is rough or the car is light.

# Gabriel Manufacturing Co. 1415 E. 40th St., Cleveland



Make Your Car Ride Easier and Last Longer

If you would know just how oil affects rubber, drop a rubber band in a can of oil and leave it there a few days. Then take it out—and you'll see the reason why there is no rubber in a Gilmer Belt.



### Why Gilmer Belts Contain No Rubber

Oil is a deadly foe of the fan belt—and under the hood of any car there is continuous and seething oily vapor. And not only oil, but moisture and raging heat are constantly seeking to broil and bake the vitals out of the belt.

Imagine ordinary fabric belts, or belts vulcanized with rubber contending against the combined assaults of oil, heat and moisture. Is it strange that most belts give out after a month or two of service?

But Gilmer Belts are specially treated with a chemical compound that enables them to really resist the disintegrating action of heat, oil and moisture. The accidents that happen to the average belt—sudden breakage, or stretching, or shrinking, or slipping—are unknown to Gilmer.

Small wonder, then, that car makers' tests have made Gilmer factory equipment on 8 out of 10 cars today. Be guided by the judgment of the car makers and make your recommendation "GILMER."

### L. H. GILMER CO.

PHILADELPHIA, PA.

"Cartonized"—The Gilmer sales-help idea. Gilmer belts are packed in cartons of 25 belts of a size. Each carton marked with the car models its belts will fit. The easy, sales-getting method of stocking belts.

Add Life to Your Belts by Avoiding the Common Faults of Adjustment



Be sure the pulleys are in line. Misaligned pulleys will ruin any belt. Before putting on a new belt, apply a straight edge to the pulleys, and true them if they are out of line.

Better consult the repair man if you are not certain of pulley alignment.

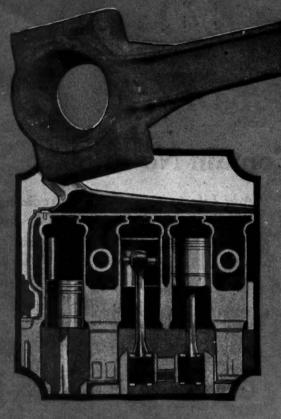


Be sure the belt is not adjusted too tightly. A tight belt forces the pulleys out of line, and may cause engine trouble. The test for proper tension is the point where the belt moves easily at the touch of the hand. If the belt is hard to turn, it is too tight. If it spins freely, the belt is too loose, and will cause trouble.

Ginnel WOVEN ENDLESS FAN BELTS

"A Spare Fan Belt is as important as a Spare Tire"





# If this connecting rod snaps

—a manufacturer's reputation snaps with it. That's why leading manufacturers of trucks, tractors and passenger cars entrust this important task to Obenberger forgings.

Drop forged connecting rods are the strongest, toughest most enduring connecting rods that can be made—the same applies to drop forgings wherever they are used. As a result there is a constant increase in the number of drop forged parts. Makers appreciate the fact that days of stern competition are approaching when the vehicle that stands the gaff will be the one to stick.

The Obenberger engineering department would like to confer with you about the number of forgings you are using in your truck, tractor or car.

They have authoritative data on stresses and strains endured by various parts. Their experience is yours to command.

The quality of Obenberger Drop Forgings is guaranteed. An Obenberger delivery promise is as good as a bond. Obenbergerfacilities insure prices that are right. Send your blue prints for quotations.

JOHN OBENBERGER FORGE COMPANY

West Allis, Milwaukee, Wis.



Forsinss

# WITHERBE

Built Right Since 1903



TRADE

Uitherbee

HAT famous phrase, "Things built right endure," is particularly applicable to Witherbee Storage Batteries.

Since 1903 Witherbee Batteries have been serving—dependably, efficiently, economically. And as a consequence two factories operating at full blast are producing Witherbee Batteries.

Each manufacturing operation is scrupulously guarded to uphold the standards of seventeen years. Witherbee Batteries are manufactured—not assembled—complete in our own factories.

The Witherbee distributorship is exclusive. Discounts are liberal and generous factory co-operation is assured. Write or wire at once.

WITHERBEE STORAGE BATTERY CO., Inc.

643-653 W. 43rd Street

New York City

STORAGE



#### Some Points of Superiority

- 1. Withstands eighteen minute breakdown test.
- 2. Plates 1-32 of an inch thicker than the Standard.
- 3. Complete unit gasket sealed.
- 4. Guaranteed for a year and a half of continuous service.



# "SUPERIOR"

Means:

When subjected to the standard discharge test at 150 Amperes, most batteries break down in from seven to eleven minutes. Every Superior Battery that leaves the factory is tested in this way, and every one must hold up under this test for Eighteen Minutes without dropping its voltage below 1 6-10.

If there is no Superior Dealer in your territory write us for information concerning this Super Service Battery.

Guaranteed for a year and a half of continuous service.

Ready for immediate delivery.

SUPERIOR STORAGE BATTERY CO.
Facuory, 23rd & Summit - Sales Department, 1506-1508 McGee St.
KANSAS CITY, MO.



# Light-Medium-Heavy-Extra Heavy SUPREME AUTO OIL

Leaves Less Carbon

In Winter

It Flows Freely at Zero

## **CONCLUSIVE**

"I'VE been storing my car with that garage for more than a year. At the start he wanted my oil trade, but after a time I found his oil was not satisfactory.

"I suggested SUPREME AUTO OIL to him, but he seemed sold on his particular noname brand and I noticed he did a very light oil business with his storage customers.

"Finally he stocked this 'SUPREME' and he tells me it is the best thing he has done—his business in oil has grown beyond his rosiest dreams.

"Personally, I have found it satisfactory—it does leave less carbon, and I would not attempt Winter driving with any other oil.



Look for the Sign of the Orange Disc

# Gulf Refining Company

General Sales Offices: Pittsburgh, Pa.

District Sales Offices:

New York Atlanta Philadelphia New Orleans

Boston Houston

# Crank Shaft G

- Eight Silver Steel Cutters working universally to-ward center. Screw Plate oper-ated by spanner wrench moving all cutters to and from center uni-versally. Cutters extend far
- Cutters extend far enough to prevent chips from clog-ging and scratch-ing surface of pin. 4 Adjustable to any
- s i z e automobile crankshaft.
- 5 allow for fillet.
- Tool, split and hinged to allow placement on pin.
- Aluminum chuck-like housing: 1½ in, wide. 7 in, diameter.
- Tapered locking pin to assure per-fect alignment.

Extract from a letter sent out by the Serv-ice Superintendent of a well known truck maker to the com-pany's Service Sta-tions. (Name on re-quest.)

"As we all know, it does not take long for a crankshaft to become out of round to prevent the proper fitting of new bearings. After rounding the crank pin up (with a Peters Crankshaft Grinder) we find it a comparatively short job to fit a new bearing. We further find that the bearing will last much longer after we dress up the crank pins with this tool."

#### How The Crank Shaft Grinder Works

PETERS CRANKSHAFT GRINDER can be easily and quickly adjusted to all automobile truck or tractor crankshafts. Can be used without removing the shaft from the engine. Micrometer exactness, needed for lasting results, is invariably obtained. Skilled labor not necessary. Always used by the better shops as a regular overhauling operation. Eliminates the delay and expense incident to sending work out of town. Never requires replacements. Satisfaction guaranteed.

Used and endorsed by an impressive list of leading car manufacturers and their service stations.

Price, complete, \$75. Order from your jobber or direct.

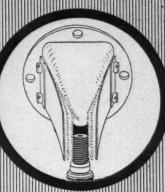
### Aluminum Brazing Solder Company

First to Design and First to Perfect the Hand Tool for Crankshaft Grinding

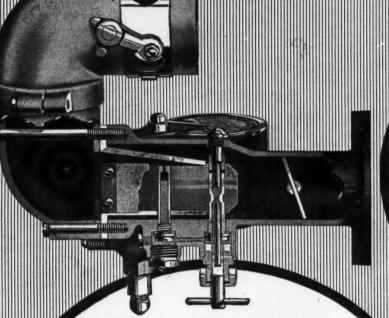
1303 Widener Building

Philadelphia, Pa.





Intermediate position of reeds changing with varying engine speeds.





THE action of the Tillotson automatic air valve is as simple as it is positive and efficient. It consists essentially of two flexible steel reeds, which form the restricted passage for the air passing through the carburetor. By atmospheric pressure, these reeds open and close in proportion to the volume of air required by the varying engine speeds.

This insures unvarying maintenance of the perfect mixture necessary to the highest motor efficiency in all throttle ranges.

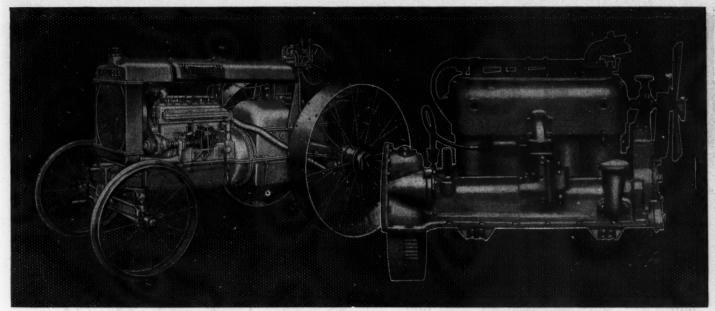
Let us figure on your requirements.

The Tillotson Manufacturing Co. Toledo, Ohio

Position of reeds at wide open throttle. High engine speeds.



The Car That Made Good in a Day



A glance shows its simplicity, sturdiness, compactness and accessibility.

### A Remarkable Service Plan

THE many dealers who handle Kardell Utility Tractors need not depend solely on the unusual compactness, strength and ease of operation of the Kardell Utility to gain the complete good will of their customers.

The Kardell Service Plan enables them to back up the other advantages of the Kardell Utility with real and valuable assistance in time of need.

Every Kardell Utility dealer is supplied with a complete service motor at factory cost. Should anything ever go wrong with a tractor in the field, he can install the new motor in place of the defective one and rent it to the farmer for a nominal sum per day while necessary repairs are being made on the original.

The installation of the new Kardell motor takes only a few hours and may save the farmer hundreds of dollars when time is more valuable than money.

Such service makes better satisfied customers for the Kardell dealer and enables the farmer to get the benefit of the full earning power of his tractor.

A few blocks of territory are left for enterprising dealers and distributors. We suggest an immediate wire.

KARDELL TRACTOR COMPANY St. Louis, Mo.

KARDELL "UTILY"



#### **SPECIFICATIONS**

Every Unit Is Standard

HERSCHELL-SPILLMAN motor, 4 cylinder, L-head, 3½" bore by 5" stroke.

CONNECTICUT ignition system, with new automatic toggle switch.

DYNETO two-unit starting and lighting system.

MUNCIE transmission, standard.

EXIDE storage battery.

ZENITH carburetor.

SALISBURY front and rear axles.

JAMESTOWN cellular radiator.

10-INCH single plate, dry disc clutch.

C. A. S. steering gear, irreversible, worm gear type.

SPIRAL BEVEL gears.

STEWART speedometer and vacuum feed.

STANDARD universal joints.

FIRESTONE tires, 33 x 4.

FRAME, extra heavy pressed steel, channel section, heat treated and hot riveted.

NEVERLEEK top equipped with plate glass in rear, curtains open with doors. HOTCHKISS drive.

WHEELBASE, 1171/2 inches.

It Conquered the World's Worst Roads

### DEALERS!

Now Is Your Opportunity To Get the TULSA Agency

The TULSA has everything and does everything any reasonable person could expect. You will be proud of it for its exceptional beauty alone. The aristrocratic body design, pleasing beveled lines, sloping windshield, full crown fenders, rich glossy finish and appointments are in keeping with the latest trend of motor car fashion. You must see the TULSA to really appreciate its beauty and the way it is built—and ride in it to know its Pullman like comfort.

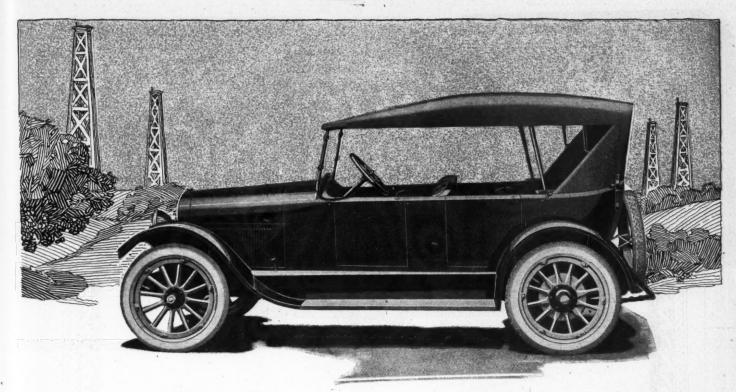
The TULSA sells and stays sold. The price is RIGHT. It is going big wherever it has been introduced. A large, impressive advertising campaign is now in full swing in all territory where agencies have been placed. If there is no TULSA distributor or dealer in your territory, wire for full particulars regarding our attractive proposition. You can get deliveries NOW!

Catalog Sent On Request

### TULSA AUTO MFG. CO.

TULSA, OKLAHOMA





# Here's the Super Value Car—\$1550

First Created for Private Needs of Oil Men—Now They Answer Public Demand for this Amazing Car

Unusual conditions forced a group of wealthy oil men to build for their own use, a car that would withstand the punishment of the world's worst roads—the oil field roads of the midcontinent fields. They called it the TULSA, after the city that is the hub of their activities.

For more than two years the TULSA has been put thru the most gruelling road tests. It has gone down into the very depths of mud, mire, sand, gumbo and ruts—over roads utterly impossible to describe.

Hundreds of TULSA cars were watched carefully for the least sign of letting up—for failure to do not just the ordinary, but the extraordinary. Minor shortcomings were remedied immediately, until today the TULSA is Known to be Right.

The public was quick to find out about the unusual performance of the TULSA. Oil men and Oil Companies asked to be supplied with this dependable car. Then came merchants, salesmen and farmers, all wanting the privilege of using this car of astounding achievements.

So what was the outgrowth of these Oil men's needs, now becomes a gift to others in the five passenger touring and roadster models.

Back of this car are millions of dollars, capital engineering skill of the highest degree and a factory organization of unusual efficiency. All of which makes possible selling the TULSA at a price in no way equivalent to its value.

The one dominant idea is to produce a car in the TULSA that is worthy of your utmost confidence now and always.

Five Passenger Touring Car—Roadster—Oil Field Special—\$1550 f. o. b. Factory.



### Rigid Inspection of All Parts

THE well-known reputation of the Lycoming Motor for extreme length of service has been attained because of the inherent quality built into its construction. All unnecessary parts have been drastically eliminated; its balance is perfect and it is readily accessible for repairs and adjustments. Every part that is used in its construction is minutely examined during its manufacture. With the exception of a few parts, the remainder are produced in our own plant. Those that are procured elsewhere are accepted or rejected at the dictates of our inspection division. These perfect parts that constitute the completed motor are again subjected to a final test when the motor is run upon the block under its own power.

Certain it is that the best in engineering skill and ability becomes more valued when the product passes tests of unusual severity, which prove that the quality desired has been attained.

Such a motor becomes even more desirable to makers and dealers alike when its performance under normal conditions is guaranteed.

Attached to the manifold of each Lycoming Motor is the Lycoming Guarantee, pledging the co-operating of the Lycoming service organization in case of serious repairs or adjustments, traceable to factory negligence.

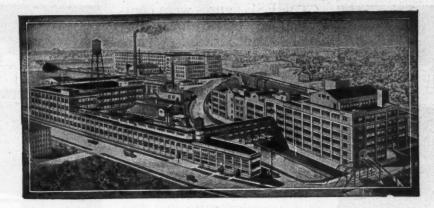
We invite motor car and truck makers to write for complete details of Lycoming construction and protection.

THE LYCOMING FOUNDRY & MACHINE CO. WILLIAMSPORT, PA.

TERRETARIA DE CONTRATO DE

NATORIA MATERIA DE LA CALLA CALLA





The ten-acre plant of the New Process Gear Corporation

## Right Gears

No matter what types of gears you need for your car, truck or tractor, we make them all and make them right.

New Process equipment and methods are highly developed to produce gears in large volume and, above all, with uniform exactness.

Automatic machines to cut teeth with precision, equipment to heat-treat gears correctly and machines to prevent them from warping, thoroughness in every detail and extreme care in inspection—these are what make New Process Gears *right*—that is why you will obtain

Quality—Quantity—Quickness

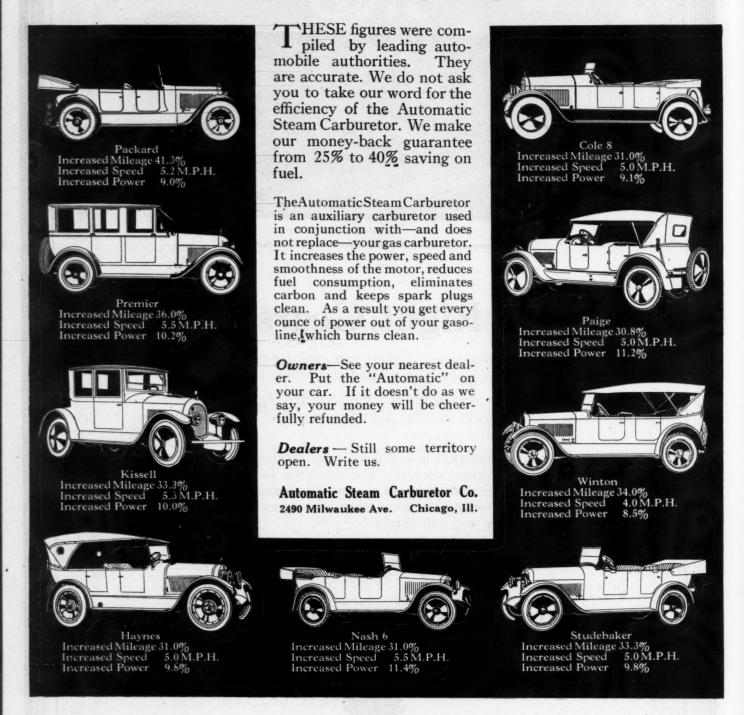
NEW PROCESS GEAR CORPORATION Syracuse New York

Member of the



New Process Fears

# Official Tests on Leading Cars Show That Live Steam Increases Mileage, Speed and Power



Automatic Steam Carburetor

# TRADE MARK TRADE MARK REG. U.S. DAT OFF

### Air Operated Valve Spring Compressor

How much time do you consume on valve-grinding jobs?

One man can do the work in half the time it formerly required of two men if a Trex Valve Spring Compressor is part of your equipment. Only three simple operations are necessary to remove the valve with the Trex Valve Spring Compressor: (1) adjust plunger after fork is in position; (2) compress the valve spring by opening air cock and remove pin or key; (3) remove valve and spring.

The Trex can be used on any type motor—V or T. You need a Trex Valve Spring Compressor.

\$15 (\$16 west of Rockies)

#### THE TREXLER COMPANY

1418 Walnut Street

PHILADELPHIA

TRES. U.S. PAT. OFF.

### TIRE TOOL

Tens of thousands of Trex Tire Tools the country over are making tire changing easy and simple. Just attach the Trex to the rim, work it like a jack and the most stubborn, rusty rim compresses so that the tire can be easily removed. When the new tire is put on, reverse the ratchet, again work the Trex like a jack, and the rim is quickly forced

back into place.
The Trex is the only practical tire tool. Every tire changing job is a demonstration. Every demonstration is a sale.

Price \$6 (\$7.00 west of Rockies)

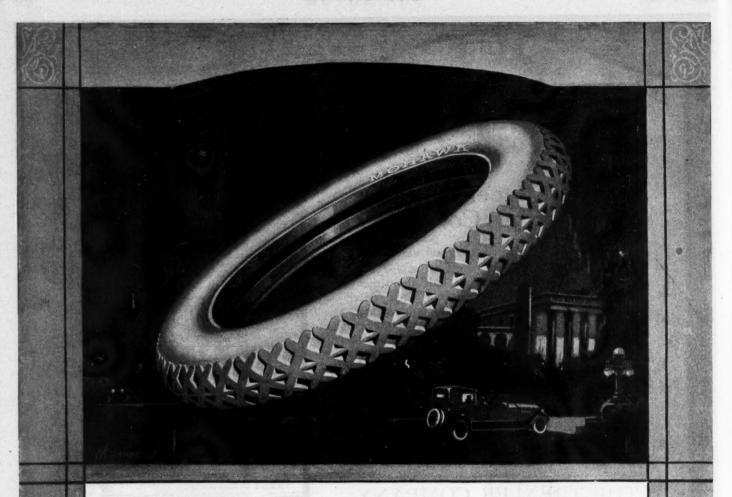
Carried by big jobbers everywhere

#### THE TREXLER COMPANY

1418 Walnut Street

PHILADELPHIA

TREX RIM COMPRESSO



### What Mohawk Quality Means To Dealers

#### Eliminates Troublesome Adjustments

Because Mohawk Quality Tires are made of the purest rubber (no substitutes) and the toughest fabric—because each is built by hand, the product of skilled craftsmen—Mohawk Tires and Tubes are of *uniform* high quality.

#### **Brings Unsolicited Customers**

The fact that Mohawks actually do give more mileage naturally make Mohawk users talk about them. This—in addition to the national advertising—brings unsolicited customers. As a number of our dealers have written us, "Mohawks almost sell themselves."

#### Insures 85% Resales

This is not an idle boast, but a statement based on actual records kept by Mohawk dealers: 85% of those who buy Mohawks for the first time become permanent Mohawk users.

# MOHAWK "Quality" TIRES

Kansas City New York

Dailas

San Francisco Chicago Los Angeles Atlanta



## What is Gredag?

THE first gear and cup lubricants to be packaged and advertised in a big way-

The first gear and cup lubricants advertised in color

in big-circulation magazines-The first gear and cup lubricants to become standard factory equipment; a small can is now included in the tool-box by over

sixty car, truck and tractor manufacturers-The first gear and cup lubricants to be based upon scientific research and laboratory control, made to meet present-day automotive needs.

Gredag's sales-curve has been well lubricated for you, with all this preparatory work. Put just a little "elbow-grease" behind its sale, and your profits on Gredag will be surprising to you. Write now for full sales information.

#### AN ACHESON PRODUCT

Automotive Sales Division, Edward A. Cassidy Co., Inc. 23 W. 43rd St., N. Y. C.

TRACTORS
Advance-Rumely, Coleman, G. O., Lauson, Linn, Lombard, Park, Port Huron, Prairie Dog, Russell, Traylor, Topp-Stewart. Triumph, Wisconsin.
In Addition, the Following Manufacturers have put their OK on Gredag

CARS
Anderson, Argonne, Bell, Birch, Bour-Davis, Buick, Commonwealth, Crow-Elkhart, Davis, Dort, Douglas, Elcar, Glide, Halladay, Harroun, Hollier, King, Kline, Maibohm, Moon, National, Oldsmobile, Olympian, Paige, Piedmont, Ranger, Raylang, Re Vere, Roamer, Saxon, Seneca, Singer, Stearns, Stewart, Vernon, Winton, Wolverine.

#### TRUCKS

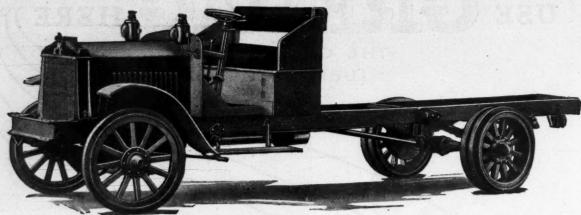
TRUCKS

Acason, Acme, Autocar, Available, Belmont, Betz, Brockway, Collier, Columbia, Day-Elder, Denby, Dependable, Douglas, Elmira, Erie, Famous, Federal, Fulton, F. W. D. (Four-Wheel Drive), Hahn, Independent, Indiana, Jackson, Kearns, Kelly-Springfield, Koehler, Larrabee-Deyo, Maccar, Maibohm, Marwin, Master, Maxim, Menominee, Mills-Ellsworth, Moreland, Napoleon, Oldsmobile, Oshkosh (Four-Wheel Drive), Paige, Piedmont, Power, Rainier, Ranger, Reliance, Rogers, Una-Drive, Sanford, Selden, Seneca, Sterling, Sullivan, Titan, Tower, Trabold, Traffic, Transport, Triangle, Union, Victor, Walker, Winther, Witt-Will, Wolverine. verine.

#### INDUSTRIAL TRUCKS

Automatic Transportation Co. Wright-Hibbard
SPECIAL SERVICE TRUCKS
Lorraine Riddle Robinson Fire Apparatus Co.
TRACTORS

Automatic Transportation Co., Automotive, Bates Steel Mule, Bullock, Dart, Eagle, Fageol, Fairmont, Farm Horse, Grain Belt, Hunt, Imperial, Kohl, Leonard, Monarch, Once Over, Peoria, Power, Reed, Reliable, Shelby, Thorobred, Townsend, Turner-Simplicity, Utility, Whitney.



The L. M. C. 21/2-Ton Truck

### **Built for Southern Roads**

The L. M. C. Truck is built in the South. Every part and feature is designed with the large factor of safety required to withstand the peculiarly trying road conditions of the South and West.

The South has thousands of miles of good roads and is rapidly building more. But to operate economically, a truck must be able to serve successfully over "feeder" roads which are scarcely more than a name and even straight "cross country."

Trucks, even though they may be successful in normal operating conditions, fail in the South and West

The L. M. C. Truck is built by men who know these conditions. It is a proven truck. Scores are now operating under conditions where other trucks have failed.

Besides this, short shipping distance and the convenience of the factory make the L. M. C. particularly desirable for Southern and Western dealers to handle.

We suggest that any dealer who is looking for a truck with extra strength to meet unusually bad service conditions and with fine workmanship which will make service troubles a rarity, get in touch with us immediately regarding details and a sales proposition.

THE LOUISIANA MOTOR CAR CO. Shreveport, La.

L. N.C.
MOTOR TRUCKS





of Cole Storage Batteries is the reason dealers sell them in volume. Cole Storage Batteries average two years' heavy duty before service becomes necessary. Give any battery that reputation, and buyers throng to increase the dealer's turnover. Cole Storage Batteries have that reputation.

We are now equipped, through the purchase of large additional manufacturing facilities to supply all styles and sizes of farm lighting plant and miscellaneous plates, as well as automobile batteries.

### Immediate Delivery

Your order will be handled in one day if it is for stock sizes. Odd dimensions require less time than other manufacturers ask. Tell us your service troubles. Write now.

Cole Storage Battery Co. 2437 Indiana Avenue, Chicago, Ill.

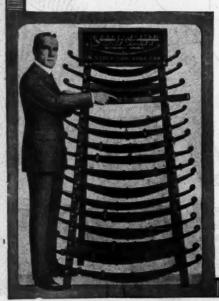
41150) S.G."





# When Springs Break, put on

This attractive display rack is free with your first order for VULCAN Springs.



An eye-compelling display of VULCAN Springs in your window will bring in the motorist who wants enduring strength and quality in a replacement spring.

The VULCAN Namepate (on every genuine VULCAN Spring) is the hall-mark of quality that clinches the sale.

If your jobber cannot supply you, write us today.

Jenkins VULCAN Spring Co.

Factory, Richmond, Indiana

Branches:

Atlanta, Ga. Atlanta,
Boston, Mass.
Pallas, Tex.
Minneapolis, Minn.

Kansas City, Mo. Reading, Pa. Richmond, Va.

Demand the VULCAN Nameplate

# EDGERTON WISCONSIN

Largest Trailer Plant in the World

#### Sell the Trailer **These Great Firms Choose**

Many Bankers Now Stipulate the Use of Trailers in Financing Truck Sales

These are a Few Large Operators of Highway Trailers

of Highway Trailers

The U. S. Army The U. S. Navy
Baldwin Locomotive Works
Philadelphia

American Telephone & Telegraph Co.
The Cadillac Motor Car Co.
Detroit
The National Tea Company
"Piggly Wiggly" Chain Stores,
Headquarters, Chicago
The Timroth Motor Express Co.
Chicago
Southwestern Telephone & Telegraph
Co., St. Louis, Mo.
Towars Creamery Co.
Detroit
Chicago Telephone Company
The T. M. E. R. & L. Interurban
Express Co., Milwaukee, Wis.
The Fisher Body Co.
Detroit
The Rex Manufacturing Co.
Connersville, Ind.
The Public Service Company

The Rex Manufacturing Co.
Connersville, Ind.
The Public Service Company
Chicago
The Timken-Detroit Axle Co.
Detroit
Lindeteves-Stokvis Co.
Amsterdam, Holland
Dutch East Indies
Semarang-Soerabaya-Batavia
Tegal-Djokjakorta-Bandoeng
Medan-Makassar
T. E. M. A.
Buenos Aires-Shanghai

Highway Trailers have established a dominant place in the scheme of modern transporta-

Nothing could emphasize their importance more strongly than the recognition of their economy and efficiency by hundreds of concerns, whose business extends not only throughout America, but in every part of the world.

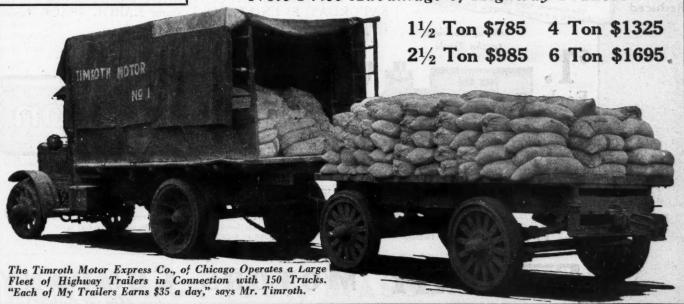
And now many bankers have endorsed the utility and earning power of the trailer, by stipulating the use of trailers as a condition to financing truck

sales. Every truck in your territory is a prospect for Highway Trailers. The time seems near when every truck sold, will sell one or more trailers.

The quality and construction of Highway Trailers is proved by the fact that it was the only trailer accepted without design change by the U. S. government, which operates more than \$1,000,000 worth.

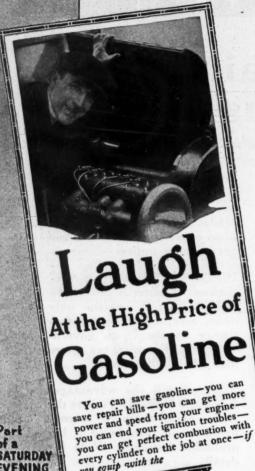
You can sell the advantages that made Highway Trailers the choice of all these. It is your opportunity to build a big profitable business. Write for details.

Note Price Advantage of Highway Trailers



GUARANTY Spark Intensifire

# We Guarantee



you equip with the

Part of a SATURDAY EVENING POST Adv. Reduced A Quick Seller

We absolutely GUARANTEE the Guaranty Spark Intensifire to Save up to 25% Gasoline, and we authorize the Trade to sell on an Iron-Clad Money-Back Guarantee.

#### We also GUARANTEE that it will:

- (1) Show how each cylinder is firing the minute you look under the hood.
- Eliminate ignition trouble, by in-dicating the slightest disturbance in the ignition system and locating trouble exactly.
- (3) Intensify spark, automatically keeping spark plug clean.
- Eliminate short circuit caused by carbon.
- Give a rich, fat hot spark in the cylinders that keeps them free from oil and carbon.
- Overcome trouble with leaky or oily cylinders.
- (7) Make old plugs fire like new even if porcelain is broken.
- Make car start much quicker and easier in cold weather because of intensified spark.

#### Big Advertising The Saturday

A real consumer DEMAND is being created for you - the Jobber and Dealer-for the Guaranty Spark Intensifire.

We have signed a BIG CONTRACT with the publishers of the SATURDAY EVENING POST using LARGE SPACE (complete half pages) every month for a full year.

And the contract is NON-CANCELLABLE,

The Guaranty Spark Intensifire is not an expendit is a scientific triumph. It is making Liberal Discount to the Trade

GUARANTY

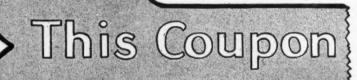
Spark Intensifire

Each Attached in a Jiffy!

#### For ANY

Truck, Tractor, Motor Boat or Gasoline Engine. One required for each spark plug.

Especially tempered glass, eliminating all possibility of fire hazard.



The sale of the Guaranty Spark Intensifire is unlimitedand our sales plan is revolutionary.

Order whatever quantity you think you can sell—and if you miss your guess, we'll take back any quantity you may have left at the end of 90 days, if you so desire, and refund the full purchase price.

MOTORS COMPANY

Mfrs. of the well-known

# Your Sales!

**GUARANTY** Spark Intensifire

# Because Its a Saver

JOBBERS AND DEALERS:-

We absolutely GUARANTEE YOUR SALES!

For a limited time we will accept your order for Guaranty Intensifires and grant you the privilege of returning (at our expense) any you do not sell within ninety days and refund the full purchase price of whatever quantity you may return.

Couldn't make a fairer proposition than that, could we?

Why do we do it? Because we want to obtain quick distribution in every section of the country, so as to secure maximum results from our —

# Campaign in Evening Post

Other publications, such as the "Ford Owner" etc., are being used also. Note the partial reproductions at the sides of this announcement, showing two of the SATURDAY EVENING POST advertisements in reduced size. The first one appeared in the issue of May 22nd—and remember a complete half page Saturday Evening Post advertisement will run every month for an entire year.



# Guarantees Your Sales

Circulars, attractive counter display cases, window display material, and electros for newspaper advertisements, furnished with every order.

Get in on this startling offer-you take absolutely no risk.

Place your order at once. Mail the coupon, or better still — WIRE your order collect by Night Letter using the same wording as in the coupon.

CAMBRIDGE (39), MASS.

"Guaranty" Line

Mail (or WIRE) to-

Guaranty Motors Company Cambridge 39, Mass.

Reduced

Ship (state quantity)\_\_\_\_\_\_ Guaranty Spark Intensifires

Via \_\_\_\_\_\_
This order is placed in accordance, with your advertisement wherein you GUARANTEE THE SALE of these Intensifires and agree to take any or all of them back within 90 days if not sold.

Firm\_\_\_\_\_Address\_\_\_\_\_

City\_\_\_\_State\_\_\_\_\_

Motor Age June 00, 1920

#### The Advantages Of the Norlund Jack Appeal To Every Car Owner

EVERY car owner has had more or less experience with a jack some time or other and he has his own ideas on how a jack should be built.

The builders of the Norlund Jack put in all the good elements of a jack and eliminated the poor ones.

In other words, the manufacturers of this super jack have profited by the mistakes made in the ordinary jack.

#### Why the Owner Likes a Norlund

It is light in weight but sturdy.

It has a 5-year replacement guarantee.

It operates with a worm gear, which eliminates all slipping and jerking. This worm gear also permits the raising or lowering of the jack to any position within the fraction of an inch, rather than at a certain height, predetermined by the position of a rachet tooth.

#### Made of Malleable Iron

Every part of this jack is the very best malleable iron. No bulit-up base full of rivets or screws to work out or loosen; just a solid piece of malleable iron.

The jack can be placed in any position under the car with the long handle.

Handle comes in joints convenient for carrying.

#### NORLUND NOVELTY COMPANY

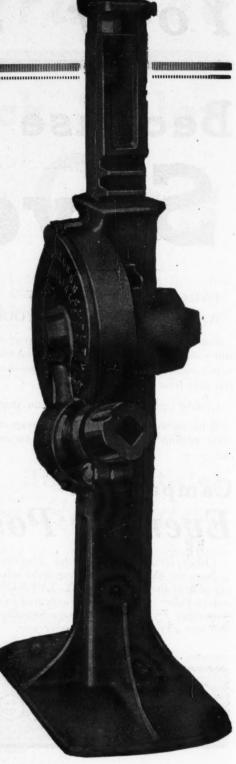
Williamsport,

Pa.

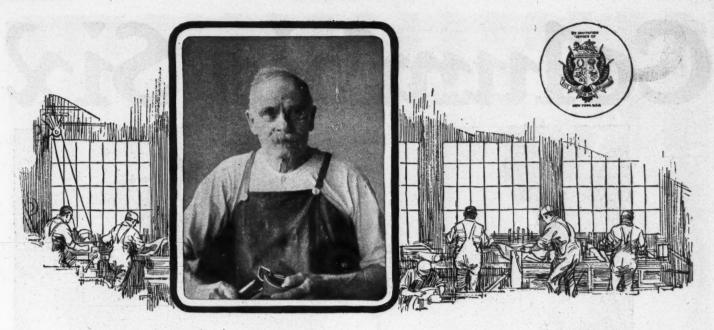


#### Dealers Make Easy Sales

Norlund Jacks are easy to sell because of the many advantages stated here. We have an attractive proposition for live dealers.



NORLUND SAFETY AUTO & TRUCK



# 100 Men on the Same Jobs for Twenty Years

A noted financier once gave this as his formula for success:

"First, be sold on your own business—and then make products so good that men will come back for more of them."

The character of the House of Campbell may be judged from this fact—the terms of service of 100 men in the Campbell organization average more

than 20 years.

The head order clerk has been with the Company 40 years, the manager 30 years, the buyer 25 years, the manager of the tannery 35

years, and so on throughout the entire roster.

You can put implicit confidence in the quality of products produced by the House of Campbell—they are the work of men who are sold on their business.

Scrutiny of the records shows the same steadfast loyalty by the 15,000 dealers who handle Campbell Products.

And back of them are users who have purchased Campbell Products season after season for more than a generation.

To make a friend, sell him a Campbell Product.

Some of the products that bear the Campbell tag of quality Detachable Upholstery, Tire Covers, Fan Belts, Radiator and Engine Covers, Rain Shed for Fords, Tool, Bulb, and Spark Plug. Cases, Leather Straps, Side Curtains and Top Recovers for Fords, Document Cases, Thermostatic Bottle Cases, Braxton—the Belt for Men, Harness, Saddlery, Equestrian Products of all kinds.

The Perkins-Campbell Company, 622-626 Broadway, Cincinnati, Ohio

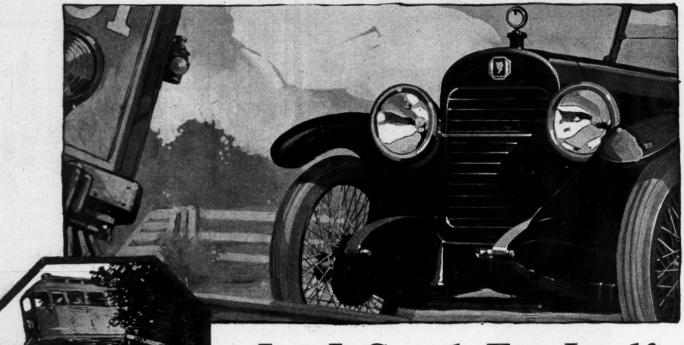
CAMPBELL

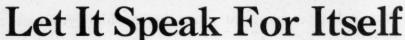
Look for the Tag

PRODUCT

PR

# Columbia Six





The uniform success Columbia dealers have had with the line is now generally known throughout the trade.

The elimination of so large a percentage of service troubles and expenses has been a surprise to dealers everywhere who have heard of it.

But, if you are looking for a new line of cars, your decision is too important to depend on any outsiders word for these things. Find out for yourself.

Write to a number of Columbia dealers. Find their names in the directories or we will give them to you.

Talk with a few Columbia owners.

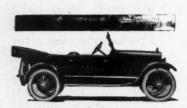
Get the general public's opinion of the Columbia by asking your acquaintances what they think of the car.

That will give you a true line on its sales possibilities.

It will show you why the Columbia line is proving one of the most profitable selling franchises in the automobile field.

But first write to us so that we can give you the details of our selling proposition and a full description of the line.

THE COLUMBIA MOTORS COMPANY DETROIT, U. S. A.



Five Passenger Touring Car

The Columbia Six Line also includes the following models:

Four Passenger Sport Model— Wire Wheel Equipped

Two Passenger Roadster

Two Passenger Coupe

Five Passenger Touring Sedan

Gem of the Highway





With Internal Gear Drive \$2075 With Worm Drive

#### "NOW'S the time and NOW'S the hour"

Truck buyers are waiting at your door—the "reconstruction period" of American transportation is here - you can "tie up" with the Huffman factory today (if we are not represented in your territory) - "tomorrow" never comes. It costs you nothing to FIND OUT about our dealer proposition. You "take no chances" with the Huffman factory organization—it has "made good" with too many dealers to "fall down" with you.

#### GENERAL SPECIFICATIONS

MOTOR—Model B 4-cyl. Continental Red Seal. MOTOR—Model C 4-cyl. Buda. IGNITION—Dixie High Tension Mag-

neto.
CARBURETOR—Zenith.
CLUTCH—Fuller, dry disc type.
TRANSMISSION—Fuller, Unit Power

Plant Type.

STEERING GEAR—Lavine Irreversible.
FRAME—Hydraulic Pressed Steel Chan-

nel.
FRONT AXLE—Torbenson Internal Gear or Standard Worm Drive.
SPRINGS—Perfection—Special Design.
TIRES—Firestone.
WITCH RASE...140 inches.
LOADING SPACE—10½ ft. from rear of seat to end of frame.
CHASSIS WEIGHT—3200 lbs.

Read the specifications—look at the price—just think of it—\$1695 for a 2000 to 5500-pound carrying capacity truck (including body weight, of course), and you will realize why the Huffman Truck is a "self-seller."

> Prospects are waiting to give you money. If you want it wire us today.

#### Huffman Brothers Motor Co.

Factory: Elkhart, Indiana Makers of The Huffman Six-a Family Car Showhoow: 2425 Michigan Ave., Chicago



# Millions Have Bought It —millions more need it!

Millions of SHALER 5-Minute Vulcanizers have been sold to motorists.

Millions of other motorists are being induced, through our large advertising campaign, to want the SHALER 5-Minute Vulcanizer.

The dealers who sell it make the profits.

Dealers predict larger sales of SHALER 5-Minute Vulcanizers for the future than during the past. Larger repeat-sales—and profits for dealers—must follow.

## SHACER 5-MINUTE VULCANIZER

Every sale of a SHALER 5-Minute Vulcanizer is not one sale and one profit alone—it means that more sales will follow from the same customer, because he needs to buy the Patch-and-Heat Units regularly for use with the SHALER.

This repeat business comes to you—and brings you regular profits—in addition to your profits from selling the SHALER Vulcanizer—and without any effort on your part.

#### Get Your Share of This Big Business-Order from Your Jobber Today!

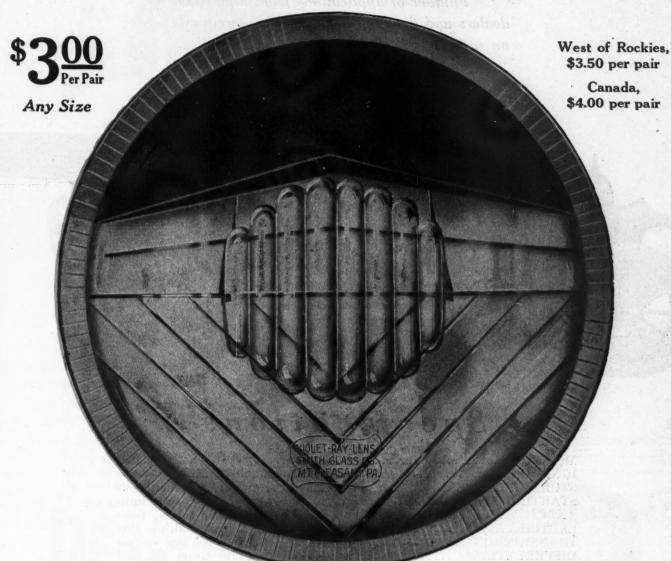
Keep a good stock of SHALER 5-Minute Vulcanizers and SHALER Patchand-Heat Units. Display them prominently in your windows and on your counters, so that motorists know you sell them. Our advertising will bring customers to your store—the SHALER sells itself. Order from your jobber today or write us at once for full information and catalog of the complete SHALER Line.

C. A. SHALER CO.

225 Fourth Street

Waupun, Wis.

Oldest and Largest Manufacturers of Vulcanizers in the World



#### The Blue Lens with Black Visor

The Violet Ray certainly will be the popular Lens in your territory this year. It will keep moving - and moving fast - because of its merits.

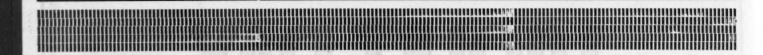
You can look this big light in the face with-

out batting an eye. Its blue glass absorbs all glare rays and its smart black visor prevents any upward shafts.

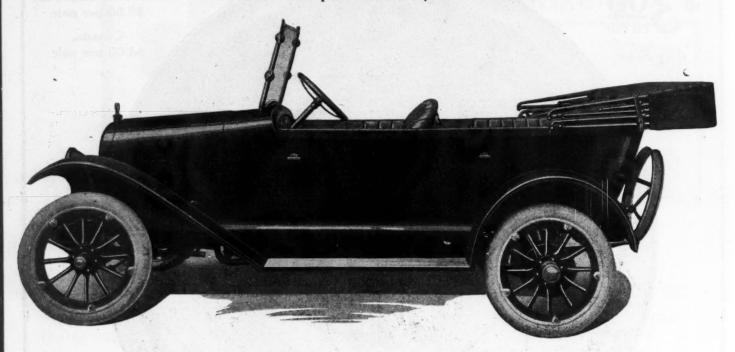
It gives a big white light on the road—the best you ever drove behind.

Write us for attractive proposition.

L. E. SMITH GLASS CO., MT. PLEASANT, PA.



WE are in position to entertain a limited number of applications from high-class dealers and distributors for choice territory, on a tried and proven line of automobiles.

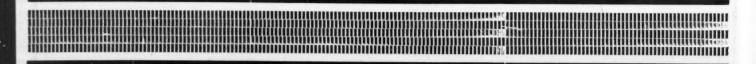


#### Specfications

MOTOR 4 cyl., 3¾ x 4¼ en bloc
IGNITION Connecticut Automatic Distributor System
STORAGE BATTERYWillard 6-80
STARTING AND LIGHTINGAuto-Lite, separate units
AXLES Full floating rear; I-beam forging front
CLUTCHBorg & Beck Multiple Disc
TRANSMISSION Selective, 3 speeds forward, one reverse
DIFFERENTIALBrown-Lipe Gears, 41/4 to 1
RIMSDemountable, one extra
WHEELS30 x 3½, 12 spokes front and rear
WHEELBASE
EQUIPMENT includes Stewart speedometer, electric horn, starting and
lighting system and Motometer.

We are in position to make prompt delivery. Phone, write or wire for selling proposition.

The Moore Motor Vehicle Co. Danville, Ill.





# Wherever you find a Ford — you have a prospect

Everywhere you go you see the reliable Ford car. This fact, together with an ever-increasing market for the replacement of radiators, makes the

## PEERLESS HENAENSEMB RADIATOR

For Ford Cars

a valuable addition to your equipment business.

Dealers everywhere become enthusiastic over our selling plan—and are PEERLESS BOOST-ERS ever after.

Your jobber can tell you—or write direct to us. Address Dept. 8.

Retail Price \$25.00



The Reerless Guaranteed Honeycomb Radiator is designed to meet all requirements for Ford Cars. Its unique core construction, which gives it so much cooling surface, also permits of a flexibility that will withstand freezing.

The CORCORAN Mfg. Co.

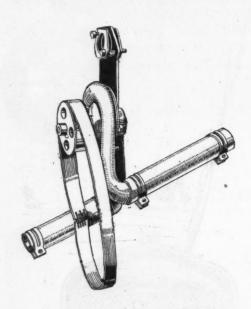
## "Make Accessories Help Carry Your Garage Overhead"

-This significant headline, and accompanying article, from Motor World of April 14th, suggested the following

Practical, Trouble-Saving Devices Such as the Atlas Centrifugal Water Circulating Pump for Fords Mean Ready Profits for All Dealers

"A good many garage men," says Motor World, "are making sales of automotive equipment carry their overhead—or most of it."

How about you, Mr. Dealer? Are you cashing in on accessories? Are you alive to the sales opportunities at your very doors?



Take the Atlas Centrifugal Water Circulating Pump for Fords, as an example. Are you aware that there is a natural demand for this perfected cooling system which is limited only by the number of Ford cars?

Hundreds of Ford owners drive into your garage or past your door during the year. Each is a ready and willing prospect for this improved system which eliminates boiling and steaming and constant annoyance. You will do them an appreciated service by recommending the Atlas Pump—a service that will win their continued patronage.

The Atlas Pump is easily installed in 20 minutes. Simply remove the two bolts that hold water outlet to cylinder jacket, slip in pump bracket and

gasket, screw up bolts; fasten water connection and slip on fan belt. All equipment including copper asbestos gasket, fan belt, hose and fasteners is furnished complete with each Atlas Pump.

Delivered, Complete, East of Mississippi River, \$10.00 Delivered, Complete, West of Mississippi River, \$12.00

Note:—If there is no Atlas Dealer in your vicinity we will ship to you direct on receipt of price.

The Atlas Brass Foundry Co. 1008 S. Front Street

**COLUMBUS** 

OHIO

The Atlas Brass Foundry Company 1006 S. Front Street, Columbus, Ohio

Please send full information and dealer offer on your Atlas Water Pump for Fords.

Name ...

Address .....

Jobber's Name

Jobber's Address

## All Motorists Use Vesta Service Stations



Vesta Service Stations are not confined to the users of Vesta batteries for their business.

Practically all motorists know about and appreciate the value of Vesta patented features in the repair of any battery.

In fact, 75% of Vesta Service Station repair work is on other makes.

Because of this, Vesta Service Stations get the best and the most profitable repair business. They are recognized leaders in their community. All Vesta Service Stations maintain a high standard of equipment and service.

Automobile dealers and garage men recognize the worth of Vesta batteries by consistently suggesting Vesta to car owners.

#### **Vesta Battery Corporation**

(Formerly Vesta Accumulator Co. 2100 Indiana Avenue Chicago, Illinois

#### Branch House Subsidiaries:

Vesta Electric & Supply Co. Atlanta, Ga.

Boice Motor Equipment Co. Boston, Mass.

Vesta Battery Sales Co. Cleveland, Ohio

Vesta Detroit Battery Co. Detroit, Mich.

Kansas City Battery& Supply Co. Kansas City, Mo. Vesta Pacific Battery Co. Los Angeles

Vesta Storage Battery Co. New York City

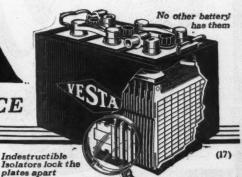
Omaha Battery & Service Co. Omaha, Neb.

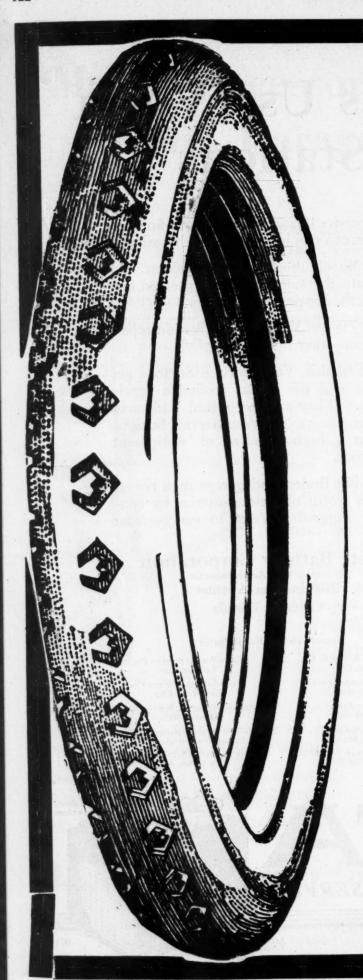
Double Life Storage Battery & Service Co., Pittsburgh, Pa.

Vesta Battery & Equipment Co. St. Louis, Mo.

VESTA

COSTS LESS PER MONTH OF SERVICE





# DOSS

Non-Skid

# TIRES

# 8000 Miles Guaranteed

Offer Distributors an unusually attractive profit on frequent turnover.

A tire that embodies every degree of quality and endurance to assure its unqualified approval by its users.

A factory policy heartily in accord with the distributor and his welfare and purposes.

Territorial allotment and effective factory co-operation in advertising and sales helps.

Greatly increased sales and profits because of our remarkable mileage guarantee.

Write for our exceptional inducements to Distributors.

Doss Rubber & Tube Company

Atlanta

Georgia

Doss Tires build steadfast good will and big profits.





#### MARLIN-ROCKWELL INDUSTRIES



The Most Perfect Spheres
Ever Made



Chrome Alloy Steel Balls as developed by new S. R. B. processes especially for



#### ANNULAR BALL BEARINGS

ONE TEN-THOUSANDTH of an inch is equivalent to about one-thirtieth of the thickness of a human hair. This delicate measurement represents the limit of error allowed by the standards of accuracy established by engineers for steel balls used in highest grade ball bearings. No two balls in such a bearing may vary more than that. Yet S. R. B. practice has far surpassed even this exacting standard.

S. R. B. accuracy has attained a point where the liquid measuring gauges which plainly show variations down to fractions of 1/10,000 inch fail to register any variation whatsoever either as to diameter or sphericity.

You will find S. R. B. Bearings in those motor cars, trucks and tractors whose names are instantly thought of as leaders in their respective fields. The same is rapidly becoming true as regards the leading makes of high-speed industrial equipment, machines and motors.



#### STANDARD STEEL AND BEARINGS INCORPORATED

Philadelphia Plainville, Conn. Norwich, Conn. New Haven, Conn. Standard Roller Bearing Co. Standard Sales and Service Distributors in Principal Civies

Offices WI MADISON AVENUE NEW YORK CYTY

MARLIN-ROCKWELL

#### Atlas Crankshaft Grinder

A Hand Abrasive Tool That Every Automobile Repairman Should Own

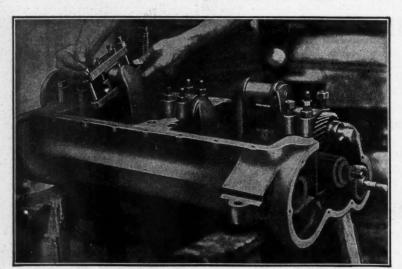
A TOOL invaluable as a service economy for Fleet Truck owners, Service Stations and Garage Repair Shops. It pays for itself first time used and is ever after a continuous profit. It is the pioneer of Crankshaft Grinding Tools with more

than 5000 in use throughout the World. The price brings the Atlas Tool within the reach of every repairman. It does not require mechanical skill to operate and its efficiency assures absolute accuracy and quick service.



#### EQUAL OF ANY AND SUPERIOR TO MOST CRANKSHAFT GRINDING TOOLS

THE Atlas Abrasive Tool will true up a crankshaft to one-thousandth of an inch in less than one hour, without removing shaft from crankcase. Only one tool needed, insert new cutter when necessary, each cutter is good for truing ten to twenty pins. It is adjustable to all crank pins from 1 3/16 inches to 2½ inches



An Atlas Doing Its Work Without Removing Shaft from Crank Case. This Crank
Case removed from car only to take photograph, otherwise unnecessary.

in diameter. No extra equipment necessary. Use the same old bearings, for the Atlas Tool removes just enough to true up bearing, making rebabbitting unnecessary. With the Atlas you will build up a valuable reputation for the best service. Your work will be of higher quality than can be bought from any shop which does not use the Atlas. For use on passenger cars, trucks and tractors. Buy this Tool now. Be prepared for the next job.

WRITE OR WIRE ORDER TODAY

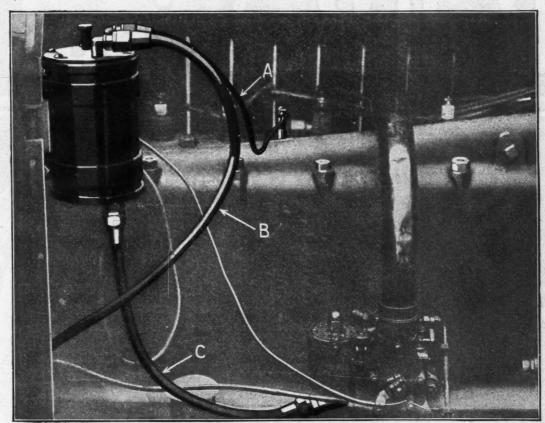
#### ATLAS MANUFACTURING CO.

North Side Station

PITTSBURGH, PA.

ATLAS MFG. CO.,
Dept. E, N. Canal St., Pittsburgh, Pa.
Send me postpaid, one Atlas Abrasive Tool complete with ( ) extra cutters, also instructions for use.
Name
Address

# Power Predominates In Cars Equipped With Sparton Fuel Feeder



A Pipe to

B Pipe to

C Pipe to

DRIVERS of motor cars equipped with the Sparton Fuel Feeder are assured of climbing hills without a continual shifting of gears.

For power predominates in cars equipped with the new Sparton Fuel Feeder.

The engine won't "stall" for gas aplenty is assured. Motors die on a grade of fair per cent only when the gas supply is choked.

That often happens when the vacuum tank fails to function properly, either because the vacuum is exhausted, or because the tank does not dump often enough.

Motors fed by the force generated in the combustion chamber, the basic idea of the Sparton Fuel Feeder, will not die for want of gas.

As the car takes the hill, and the labor of the motor increases, so, as the engine demands it, gas is fed by this new device.

Usually the hill can be taken on high. It is never necessary to lose momentum by stopping while the tank refills—and then start the climb again on low.

(173)

The Sparks-Withington Co.



Jackson, Michigan



The pride of possession that buyers find in your car is realized only in day in and day out performance without expert attention. Do you realize how much New Departure Ball Bearings contribute to this end? The infinite care with which the quality of New Departures is safe-guarded is an item that should not be overlooked in your selling talk.

000

x Departure Manufacturing

Chircardo Devisor

## 90% of All Troubles Are Bearing Troubles

From careful observation it has been determined that fully 90% of the motor trouble originates in the bearings.

The "high spot" areas in the imperfect, hand scraped bearing carry the load and it is here, through faulty lubrication, that metal to metal contact comes, starting the "pick up."

A "pick up" of a thousandth of an inch makes a high riding point that causes a hot bearing. Unless this "pick up" can be immediately cut away and the bearing freed, serious consequences result.

A pinch of TIMESAVER Bearing Abrasive Compound mixed in the lubricating oil will almost instantly grind the bearing free and end the trouble, but—

If the bearing had originally been ground in with TIMESAVER Compound it will have had a uniform surface for the film of oil, insuring perfect lubrication. Hence there would have been no metal to metal contact and no "pick up."

Because TIMESAVER Compound will not cut iron or steel and because it is soluble in oil, which causes it to lose. all abrasive power after a few minutes use, it is absolutely safe, even in the hands of the most inexperienced.

TIMESAVER Compound is unique There is nothing among abrasives. else in the world like it. It will produce perfect surfaces in any size or type of babbitt, brass or bronze bearings in about a quarter the time taken in handscraping.

Thousands of users in the marine, automotive and mechanical fields have already discarded other methods for the TIMESAVER way of fitting bearings. If you are not yet familiar with the marvelous results being attained mail the attached coupon with \$1.50 and a trial can will be sent you. Your money will be refunded if you are not entirely satisfied.

#### M. T. K. SALES CORPORATION,

296 Andrews St., Rochester, N. Y.

International Distributors Timesaver Bearing Abrasive Manufacturers, M. T. K. Products Company, Seattle, Wash.

#### Branch Supply Station

Timesavers Sales Corp., 370 W. 51st St., New York City.

U. S. Products Co., 224 Highland Bldg., Pittsburgh, Pa.

Timesaver Sales Co., 403 American Trust Bidg., Cleveland, O.

Timesaver Sales Co., 513 Chamber of Commerce Bldg., Chicago, Ill.

Timesaver Sales Co., 1129 Nicolett Ave., Minneapolis, Minn.

J. H. Weber & Son, 318 Central Bldg., Los Angeles, Cal. Western Motor Supply Co., Shadholt and Boyd fron Co., Milwenkee, Wis. Henderson & Nilan, Hetana, Mont. Modern Specialty Co., Fargo, N. Dak.



#### USE THIS COUPON

M. T. K. Sales Corporation, 296 Andrews St., Roohester, N. Y.

Enclosed \$1.50 for sunce can of Dime-saver Compound with directions. Money back if not satisfactory.



Star Thres are "star" thres

#### Star Tires Make "Star" Customers

The attractive appearance of the Star Tire instantly makes friends.

It is easy to sell a man his first Star Tire. And when he experiences the rare service a Star Tire gives him, repeat sales are bound to follow.

A steady increase in sales and profits are the result of making the average tire buyer a "Star" customer.

Star Tires are hand-built by "star" builders who use "star" materials only. Not an ounce of reclaimed or substitute rubber goes into them. The white tread and sidewall rubber of the Star Tire is zinc-toughened to insure long wear under all road conditions.

The Exclusive Star Agency plan protects your increasing Star sales and helps you in many ways to upbuild your business. Write for details.

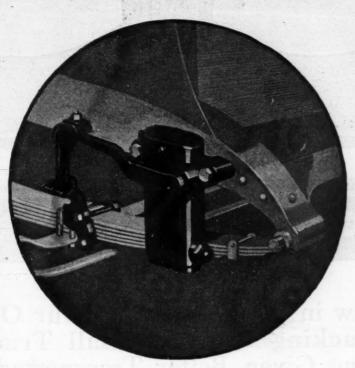
#### THE STAR RUBBER COMPANY AKRON'S MASTER TIRE BUILDERS

1063 Crozier St., Akron, O.

BRANCHES:

New York. Atlanta, Ga. Dallas, Texas. Chicago. Kansas City, Mo. San Francisco. Export Department, 44 Whitehall St., New York, N. Y.

STAR CORD TIRES



# Riding comfort under all driving conditions—

It's as plain as mud on a windshield that unaided springs cannot give equal riding comfort at four miles or forty, over asphalt or ruts, with two passengers or seven.

That's why you don't hear anybody asking "Do I need shock absorbers?" The question nowadays is, "What type of shock absorbers shall I install?"

But no one who ever rode over a set of Lovejoy Hydraulic Shock Absorbers ever asks that. For him there is only one answer.

Lovejoy Hydraulic Shock Absorbers put comfort into your car, and keep it there. They are strongly built, and require no adjustment. They work in oil, and always work silently. You might never be conscious that they were on your car, except for one thing—they give riding comfort under all driving conditions.

The coupon will bring you which ever you specify—detailed information, or a thorough trial. (If you are a dealer, just pin the coupon to your letterhead.)

THE PACKARD ENGINEERING CO. CLEVELAND, OHIO

L Shock Absorbers



#### HALL TRUCKS

#### How in the Solution of Our Own Trucking Problems Hall Trucks Have Given Better Transportation To All the World

THE reason Hall Trucks so admirably meet the transportation problems of modern business is a simple one.

As makers, handlers and transporters of heavy structural steel for more than forty-six years, this company had its own trucking problems.

None of the many trucks we had tried proved equal to the difficulties we had to meet. None lasted sufficiently long in our unceasing, heavy work.

So we decided to build our own trucks—transports capable of withstanding severe punishment over a period of many years.

And thus was born the Hall Truck five years ago.

As steel analysts and manufacturers, Hall engineers knew the capabilities of truck strength and endurance. As truck users in the most difficult of truck usage, they knew the users' need.

Hall Trucks, therefore, are designed and manufactured by men whose forty-six years' experience in the study of heavy transportation problems has peculiarly fitted them for the task of producing the world's most durable truck.

Hall Trucks have solved our own hauling difficulties. They have more than met the expectations of other users.

Business men find Hall Trucks lastingly dependable. Hall Trucks are serving hundreds of business men with marked ability and freedom of repairs.

It will pay you to look into the Hall line and see why it is the foundation of so many high-grade hauling systems.

Address Sales Manager, 17 Roby St., Detroit, Mich.

#### LEWIS-HALL MOTORS CORPORATION

Manufacturer of the Hall Trucks.

As Manufactured by
The LEWIS-HALL IRON WORKS



#### Transmits the Power Without the Shock

The strain on the universal joint is intensified with every irregularity of the road

MUDHOLES — sharp turns — steep hills—worn-out roads—all test the universal joint.

At every irregularity in the road the universal joint must adapt itself to abrupt changes in the angle of the drive

Metal joints wear loose under this severe strain. They transmit road shocks and engine shocks.

Cushioning the shocks and strains

To save a car this severe wear and tear, the Thermoid-Hardy Universal Joint has been designed. Built of flexible fabric discs it absorbs the blows that rack the gears and bearings. The Thermoid-Hardy joint transmits the power without the shock.

Having no metal-to-metal wearing surfaces the Thermoid-Hardy Joint cannot wear loose. It requires no lubrication—no constant attention.

Adopted by leading manufacturers

More than fifty leading manufacturers are using the Thermoid-Hardy Universal Joint as standard equipment. It has stood severe

In building up the flexible fabric discs, the several layers of fabric are put together so that the strands in each piece run in a different direction. This patented fanwise construction provides the greatest tensile strength. In a laboratory test made recently at Purdue University, the drive shaft itself was twisted at a total stress of 21,700 inch pounds without injury to the universal joint.





tests for endurance—in many cars running 60,000 miles without replacement or adjustment of any kind.

More and more motorists are favoring new cars equipped with Thermoid-Hardy Joints.

Send for advance proofs of the national advertising campaign and our new book, "Universal Joints—Their Use and Misuse." The book contains important information for every dealer and carowner. It also tells why the Thermoid-Hardy Universal Joint has been adopted as standard by leading engineers and manufacturers.

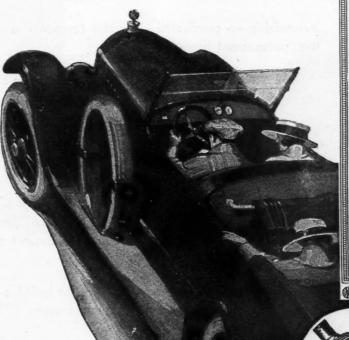
#### Thermoid Rubber Company

Sole American Manufacturers

Factory and Offices: Trenton, N. J.

New York Chicago San Francisco Detroit
Cleveland Atlanta Philadelphia

Pittsburgh Boston London Paris Turin



#### LIST OF USERS

American-British Mfg. Co. Anderson Motor Co. The Autocar Co. Available Truck Co.

Barley Motor Car Co. (Roamer) Briscoe Motor Carp.

Capitol Motor Corp.
Jas. Cunningham Son & Co.
Crow-Elkhart Motor Co.

Dart Truck & Tractor Corp. Diamond T. Motor Car Co. Doane Motor Truck Co.

Fageol Motor Car Co. H. H. Franklin Mfg. C

Garford Motor Truck C Gramm-Bernstein Motor Truck Co.

Hendrickson Motor Truck Co. Holt Mfg. Co.

Indiana Motor Truck Co. International Harvester Co. International Motor Co.

Kentucky Wagon Mfg. Co., Inc. King Motor Car Co. King Zeitler Co.

Larrabee-Deyo Motor Truck Co. Lexington Motor Co. Locomobile Co. of America

Locomobile Co. of America Maxwell Motor Corp. Menominee Motor Truck Co. Moreer Motors Co. Moreland Motor Truck Co. McFarlan Motor Co.

Moreer Motors Co.
Moreland Motor Truck Co.
Morealan Motor Co.
Nelson & LeMoon
E. A. Nelson Motor Car Co.
Nelson Motor Truck Co.
D. A. Nowcomer Co.

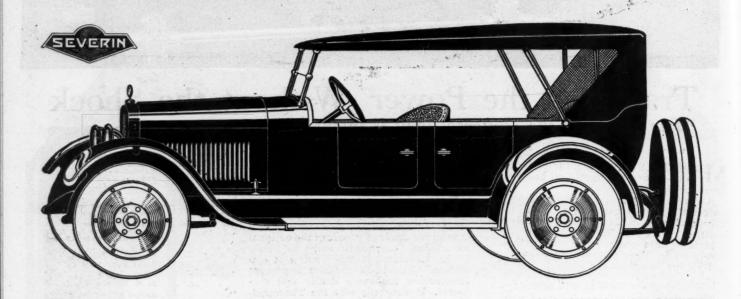
D. A. Newcomer Co.
O'Connell Motor Truck Co.
O'Connell Motor Truck Co.
Oneida Motor Truck Co.
Packard Motor Car Co.
Parker Motor Truck Co.
Patriot Motor Co.
Rellance Motor Truck Co.
Reo Motor Car Co.
Reynold Motor Truck Co.
Reynold Motor Truck Co.
Sanford Motor Truck Co.
Sanford Motor Truck Co.
Sanford Motor Truck Co.
Stughton Wagon Co.
Studebaker Corp.
Templar Motors Corp.

Tomplar Motors Corp.
Tioga Steel & Iron Co.
Tow Motor Co.
Traffic Motor Truck Corp.
Transport Truck Co.
Twin City Four Wheel Drive Co.
Waiter Motor Truck Co., Inc.
Watson Products Corp.
Wiehlta Motors Co.
H. E. Wilcox Motor Co.
J. C. Wilson Co.
Willys-Overland, Inc.

THERMOID-HARDY UNIVERSAL JOINT

Fanwise construction for strength

Makers of "Thermoid Hydraulic Compressed Brake Lining"
and "Thermoid Crolide Compound Tires."



## Makes Friends— Builds Business

Friendship — good will — is the foundation of all big, permanent business.

A sale made today is incomplete if it doesn't help make others tomorrow.

Hence, the value of the Severin in building a lasting business. It is the motor car that pleases every onlooker—satisfies every owner.

The Severin with its powerful, six-cylinder Continental motor and luxurious appearance finds a place in the hearts of motorists who expect great things of a motor car.

For live wire distributors who wish to build a lasting business, some good territory is open. Write or wire for details.

"Faithful to the End of the Road"

SEVERIN MOTOR COMPANY

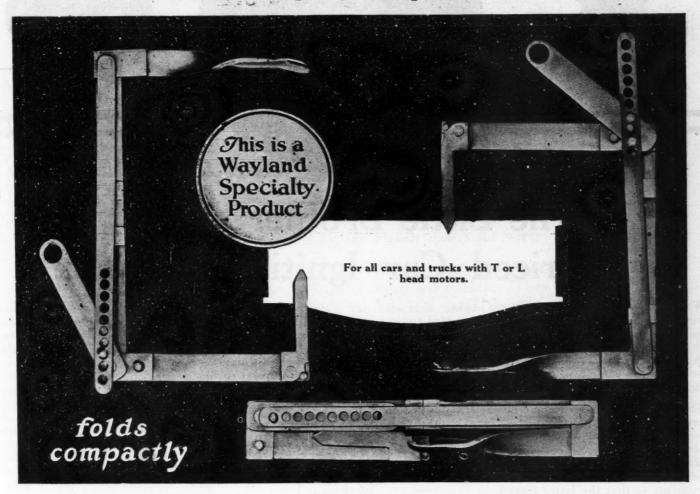
Kansas City

Missouri

## The

# FITZ AWL

The FITZ-AWL Valve Spring Compressor and Valve Lifter



It has perfect vertical action. There is no side strain imposed. Where there is no side strain or bind there can be no injury done to the valves.

Its adjustments and lift are very simple. Includes valve stems from four and a half to nine inches. It is the first device of its kind that folds up. Can be conveniently carried in tool kit.

It meets the demand for a heavy duty tool. Nothing to wear out or get out of order. Made of cold-rolled steel and polished. For use on all cars and trucks built with T or L head motors.

Ask your jobber about the FITZ-AWL and write us for folder describing this and other Wayland automotive specialties.

Wayland Specialty Mfg. Co., INC., WAYLAND, N.Y.
Makers of the Auto-Stop, Finch Extension Door Latch, Wilkins Low Gear Control and other FORD accessories

Note the overhead location of terminals. They are not subjected to accumulations of oil and dirt. Easily examined to see if properly connected. Free from side swipe of fan belt.

Insulative casing of moulded Condensite eliminates use of filmsy fibre ring. Inner surface of casing forms contact bed of timer.



Front View of Blublase



Terminals and shoes are sealed tight in the Condensite mould. Terminals cannot work loose from use of pilers on caps. Shoes are flush with contact bed. All wires are embedded.

Use of carbon brush (under holder) in place of steel transmits high voltage without pitting, and enminates necessity for oiling.



# The Little Brother to All High Priced Car Ignition Equipment

When you sell a Blublaze Timer, explain that all high-priced ignition systems have, as standard equipment an insulative moulded part like the Blublaze shell and a carbon composition brush identical to that of the Blublaze. Satisfy the Ford owner that he is buying something that resembles other Ford timers in shape only.

The well-known dielectric and chemically inert properties of Condensite eliminates, in the solid one-

piece insulative mould of the Blublaze, the flimsy, oil-absorbing fibre ring insert. The moulding process seals the terminals and segments so that the latter cannot project into the race nor the former work loose due to the continuous advance and retard action of the timer.

The overhead, get-atable location of all four terminals keeps the wires entirely free of the breather pipe oil splash and prevents rotting and short circuiting from oil and side swipe of fan belt.

The Semi - lubricating, carbon - graphite - cop-

per composition brush eliminates the necessity for oiling and transmits higher voltage without any pitting whatsoever. Though not fastened to the holder, the brush is retained in position as a holder part by an ingenious arrangement consisting of a concealed spiral spring and a flange fitted to a ferrule. The resulting, flexible tension insures a light yet positive contact that reduces wear to an infinitesimal point.

The result of these new timer features is a cleanly, wiping contact, free from mechanical disorders because of simple construction and of outlasting serviceability due to practically eliminated friction.

Order the Blublaze of your jobber. If he is not yet stocked, send his name and your order direct. List price, each, \$3.00.

Blublaze

Motor Specialties

Corporation

49-51 W. 66th St., New York N. Y

THE BLUBLAZE TIMER

FOR

FORDS

AND FORDSON

TRACTORS



# Proof from Sandy (Utah

AFTER selling Hewitt Tires for sixteen months in Salt Lake City, the Hewitt distributor wrote:

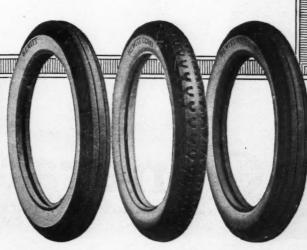
"The material used in Hewitt Tires is of highest quality. They have the toughest tread we have ever seen and the mileage is unusual.

"We have never done business with finer people than Hewitt."

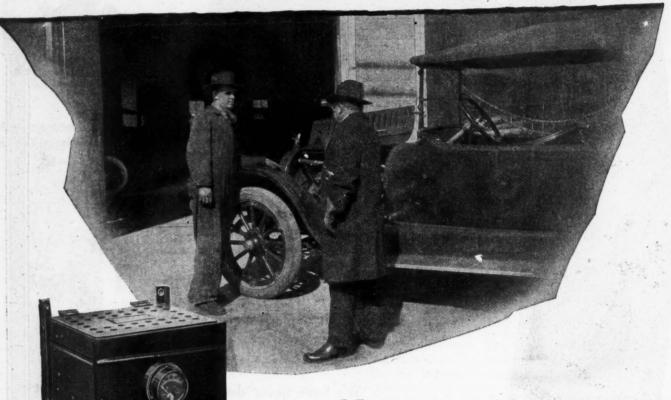
#### HEWITT RUBBER COMPANY

Factory and Executive Offices at Buffalo, N. Y

New York Chicago Boston Denver Philadelphia San Francisco



You may be operating your business profitably but unless you can give your customers complete service you are not getting maximum returns.



Four battery Tungar

#### "-and I want you to charge the battery"

What can you say to that?

Can you charge that battery?

Suppose he wanted the carbon removed and valves ground—perhaps a ten or twenty dollar job.

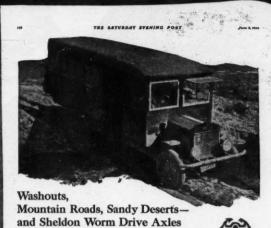
Suppose he went elsewhere because you couldn't charge his battery?

It wouldn't take many such jobs to pay for a four battery Tungar, and then you could give complete service.

Ask your jobber or the nearest GE Distributor.

35A-46









Sheldon

SHELDON AXLE AND SPRING COMPANY



SHELDON AXLE AND SPRING COMPANY

advertising.

CHELDON construction is now a matter of as close personal knowledge among the men who use trucks as among the men who make them. It pays to educate while

Duesenberg Eight-in-a-Row

Master Designer's Creation

THE culmination of twenty-two year's consistent, persistent effort to produce the ultimate engine and the ultimate car. The pooling of the experience of a lifetime. That, in brief, is what has gone to make the new Duesenberg "Eight-in-a-Row" Automobile the truly remarkable car that it is.

Not only will the engine of this car be the product of the brain of Fred S. Duesenberg, but he has also designed each component part of the entire chassis, so that everything will measure up to the high standard set by the engine itself.

In the big new plant now being erected in Indianapolis this car will be built under Fred S. Duesenberg's active supervision. Its principal units will all be manufactured, and its assembly completed in this factory.

Deliveries are anticipated late in 1920. Dealer Franchises now being negotiated

DUESENBERG AUTOMOBILE & MOTORS CO., Inc. 515-518 LEMCKE BUJLDING INDIANAPOLIS, IND.

Fred. S. Duesenberg

For ten years Duesenberg Engines have been consistent performers on the Automobile Race Tracks and 60% of all carsi taking part in authorized races during the past three years have been equipt with engines designed by Fred S. Duesenberg

## STORAGE BATTERIES

FOR

JOBBERS, SERVICE STATIONS AUTOMOBILE MANUFACTURERS

WITH

YOUR OWN TRADE NAME



We have been manufacturing lead storage batteries and parts for over five years and can make a battery that we will guarantee for a period of three years on an adjustment basis. Let us submit sample battery and quotations.

PARAGON BATTERY SERVICE CO.
DETROIT, MICHIGAN

Manufacturers of

#### PARAGON BATTERIES

The Battery sold on a Service Plan.

LOWER PRICED

SOLD MOST

In writing please state whether or not you wish our regular selling plan or batteries built with your own trade name on them.

Address Sales Department

PARAGON BATTERY SERVICE CO. 64-66 West High Street

DETROIT

U. S. A.

# ROSS STEERING GEARS

# The Choice of 171 Motor Truck **Engineering Departments**

With a thorough knowledge of the importance of the steering gear' in relation to efficient motor truck operation, the engineering departments of 171 different motor truck manufacturing plants, after a careful study of materials and workmanship, together with exhaustive tests and comparisons, have adopted Ross Steering Gears.

Each one of these 171 manufacturers use Ross Steering Gears as standard models. It is a significant fact that nearly two-thirds of all the motor trucks built in America are equipped with Ross Steering Gears.

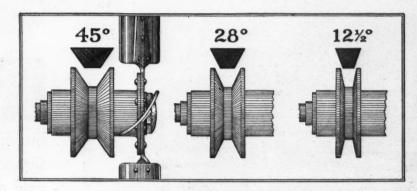
As a manufacturer of motor trucks, or as a business man considering the purequipment on from one to nine different chase of a motor truck, you owe it to yourself to investigate Ross Steering Gears, to find out why they guarantee easier steering, greater safety and reliability-why they predominate so overwhelmingly on motor trucks.

> Write for catalog and any further information desired.

ROSS GEAR & TOOL COMPANY 400 Heath Street, Lafayette, Indiana, U.S.A.

The Steering Gears that Predominate on Motor Trucks





#### A Perfect-Fitting Fan Belt for Each "V" Type Pulley

No one type of "V" belt will give satisfactory service on all "V" type fan pulleys, any more than one kind of fan will cool all kinds of motors.

H L B "V" shaped belts are specially designed to fit exactly the particular pulleys on which they are to be used.

Whether it is a fan belt with the regular 28° angle or special belts cut at 12½° or 45° the accurate methods employed in the H L B factory insure the production of a belt correct in every particular.

This perfection in belt-building is based on manufacturing experience dating from the early days of the automobile. Years of specialization have developed advanced processes, special machinery and skilled workers for making better fan belts at less cost.

For years we have been making fan belts in large quantities for many of America's leading builders of cars, trucks and tractors. Our ability to produce belts which meet their exacting specifications is your guarantee that the H L B Belts you sell are RIGHT.

Hundreds of prosperous jobbers and dealers have proved the quick-selling and long-serving features of H L B Fan Belts. The line is complete, including fan belts and leather parts for every popular make of car, truck or tractor. It will pay you handsome profits to handle it. Write for full particulars.

# "V" Belts Vee Sol

A solid "V" shaped belt, made of two plies of "Wetprufe" leather solidly cemented and either bradded or sewed

V-Lug

A "V" shaped, lug type belt, made of best grade belting leather, with lugs strongly riveted on.

Vee Flex

01

to

ng

ee

A laminated "V" belt made of highest grade oak-tanned leather. Each lamination both over and underlaps the other. Very strong and flexible.

Write for samples and prices.

#### HIDE LEATHER & BELTING CO.

Indianapolis, U.S.A.





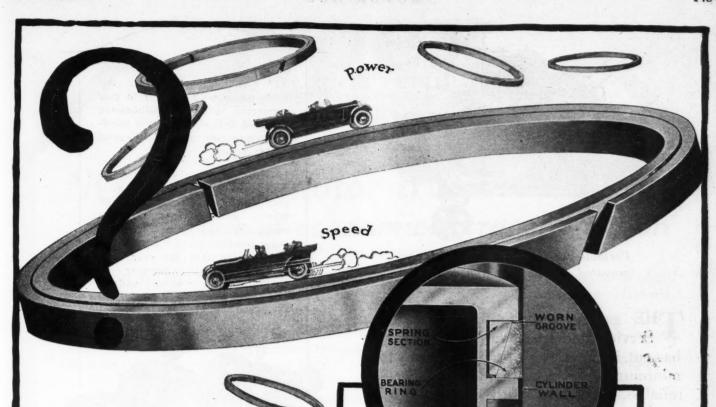
ESPONDING to an obvious need, this company is now

building an axle specially designed for one ton trucks—an axle distinguished for its mechanical efficiency and stalwart construction. Incorporating perfected bevel gear drive, this Eaton product will extend to the swift, pneumatic tired fleets of commerce a service not formerly available to vehicles of this type.

THE EATON AXLE COMPANY CLEVELAND, OHIO

THE AXLE DIVISION OF THE STANDARD PARTS COMPANY OTHER DIVISIONS ARE: THE PERFECTION SPRING COMPANY, THE BOCK BEARING COMPANY, THE STANDARD WELDING COMPANY

. . the swift, pneumatic-tired fleets of commerce . . .



You as a Service Man ought to

The Yale Ring with its two sections automatically closes the groove at top and bottom and at the same time makes a flexible, uniform contact with the cylinder wall.

The bearing ring is forced out and down by the pressure of the spring section, which slides up. Both groove and cylinder are sealed tight.



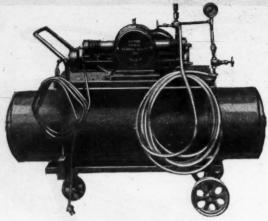
Write to our nearest distributor. Territories open to desirable dealers.

YALE PISTON RING CO., Inc. Boonton, N. J.

C. B. Bolton, 613 West Pico St., Los Angeles, Cal.

Charles L. Fawcett, St. Augustine, Fla.

Yale Sales Corp., 209 West 76th St., New York City. C. E. Patton, 682 Golden Gate Ave., San Fran-cisco, Cal.



Portable service model. Rigidly mounted, ball-bearing iron casters.

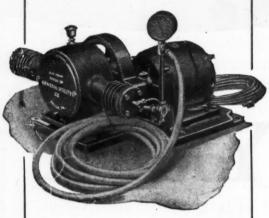
THE garage that equips itself with a Service Model General Air Compressor has cut its air service problems down to a minimum. It has provided for itself a reliable source of air fully adequate to its needs.

We designed the Service Model to suit average garage and service station requirements and it has proved itself the most popular of our models.

It is furnished with an extra large ½" welded tank, tested to 300 lbs., with a working pressure of 150 lbs. Its equipment includes an air gauge; safety valve; oil separator; 25 ft. best 5-ply rubber hose; 17 ft. of electric cable with socket switch; automatic stop and start switch; assembled complete ready for use.

Write for full information about the general line. We deal through exclusive distributors only. Some territory is still open. The General Two-Cylinder Air Compressor with its gear to gear connected ½-horse, ball-bearing mounted G-E motor, is the standard compressor unit on all General Utility outfits.

It is the product of eight years of experience and experiment and has proved in hundreds of garages and service stations that its single stage, horizontal opposed two-cylinder construction is the most efficient design that has ever been developed. It will pump over 5000 cu. in. of air per minute and do this at an unusually low cost for current.



The General Compressor shows the high quality of its design in its remarkably low cost of upkeep. With reasonable care it will give years of service without trouble or expense. It is rigidly mounted on a common bed plate with the motor. The motor is series wound and will start on load

Stationary Service Model, duplicate of Portable Service Model, but designed for stationary installation.

### GENERAL UTILITY COMPANY 1324 Ogden St. Philadelphia Pa.

Utilities that Sell Because They Serve

"The High Point of Truck Service

## NOT just a motor truck— 365 days of economical transportation

Explain to your Apex prospect that the Apex is not built just to look like a truck and sell as one. That its greatest value consists of unseen superiorities of engineering, construction and conscientious building.

Explain, too, what the Apex Twin Construction means—how it carries the truck mechanism while the regular frame carries the pay load.

Explain

how this rugged construction, high-grade world-famous parts throughout and lack of unnecessary weight enables the Apex to serve long and well. Prove to your prospect, as you can, that the Apex 21/2 ton—and the other models too—are the best trucks at their prices that money can buy.

> Live truck merchants will be interested in our agency proposition. Write for particulars.

## HAMILTON MOTORS CO.

Export Department: 25 Beaver Street, New York Cable Address: "Hammotor" New York Factory: Grand Haven, Michigan

Model C-1 Ton \$1595

Model D-11/2 Ton \$1795

Model E-21/2 Ton \$2550

Standardized Units

Motor-Buda. Transmission—Fuller.
Carburetors—Stromberg. Clutches—Fuller

Steering Gear—Lavine
Front Axles—Drop Forged I beam
with Timken bearings.
Springs—Graded Construction

Silicio Manganese Alloy. Rear Axles—Torbensen Internal

Frames-Celebrated Apex Twin-Frame Construction.

Electrically Lighted Throughout. **Engineering Specifications** on Application.







## LYONS STORAGE BATTERY

## **FACTS**

#### Why the people want it

Every motorist who knows the Lyons Storage Battery insists upon it every time.

—because our Patented Reinforced Triangle Grid with its equal triangle sections, securely locks in place the active material, thus conducting the electricity in the most efficient way.

This Grid insures greater strength and longer life.

—because the specially treated porous separators, in conjunction with the hard rubber separators, give the highest type of insulation.

-because only the highest grade of Oxides mixed by our own special formulæ, are used.

—because every battery leaves the factory protected by the Lyons Seal. This proves the newness and freshness of every battery.

Lastly the motorist is confident of the quality and efficiency of the Lyons Battery because our iron-clad guarantee assures him two years continuous service.

#### Why you should sell it

You should sell the Lyons Storage Battery because it is an unusually attractive proposition.

It sells rapidly because of its many exclusive features.

It repeats because of the absolute satisfaction it gives the user.

It is becoming widely known among motorists because of its advertising and because of the favorable comments its quality has created.

Every sale brings you attractive profits and every sale makes other sales.

The Lyons Factory stands firmly behind its product and behind those who sell it.

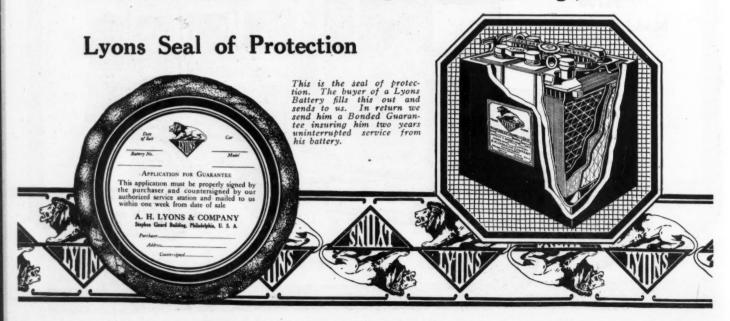
It offers in each territory exclusive selling rights to one Service Station and it protects those rights absolutely.

It assures to every dealer a battery that he can put his whole reputation behind with confidence that the battery will make good to his customers or we will make good to him.

### Immediate Shipments Guaranteed

Territory is going fast. Get in touch with us now and learn the proposition that will make Lyons business worth while to you.

## A. H. LYONS & CO., 904 Stephen Girard Bldg., Phila.





BLOCK TYPE "V" BELT





## Fan Belts That Give Real Service

Are produced by the Automotive Division of The Graton & Knight Manufacturing Company. More than sixty-eight years of experience in manufacturing leather belting and leather products stands behind these leather fan belts. The belts, illustrated on this page, are made both in Spartan and Oak-Tanned Leather. Spartan Leather is tanned by a secret G & K process which renders the leather impervious to the effects of exposure to heat, water, steam or oil.

One of the most popular of our "V" belts is the G & K Block Type which is used extensively on passenger cars, trucks and tractors. These belts, manufactured in various sizes, are furnished endless or with couplings as specified.

The solid Type "V" belt, so called because of its construction, is made in one or more continuous strips of leather, single, double or three ply, according to the requirements of the drive upon which it is to be used.

We manufacture a Laminated "V" Belt of the highest quality. The laminations are pieces of leather  $3\frac{1}{2}$ " long, riveted to each other, with a spacing of 1" between rivets. All Laminated "V" Belting is furnished in the standard angle of 45 degrees, unless otherwise specified.

Write for our catalog which illustrates the Automotive Leathers we manufacture. Its recommendations can be followed safely and profitably.

#### **AUTOMOTIVE DIVISION**

## THE GRATON & KNIGHT MFG. CO.

Oak Leather Tanners, Makers of Leather Belting and Leather Products.

WORCESTER, MASS., U. S. A.

Branches and Distributors in all Principal Cities

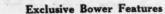
CARRIES THE LOAD



BOWER Roller bearings are radially non-adjustable, a feature that is immediately appreciated by all engineers. The end thrust can always be regulated without changing the radial alignment of the shaft.

Best of all, actual wear is practically negligible after years of hard service.

BOVER BEARING CO. Detroit Michigan



Separate bearing surfaces for load and thrust. Parallel raceways. Self-aligning. Never need adjusting. Does not develop end thrust under loads. Will not bind or end-slip.

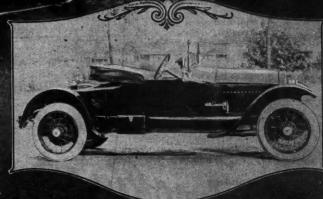


Exhibit "J"

PORTABLE ELECTRIC DRILLS

"With the Pistol Grip and Trigger Switch"

The Stutz Motor Car Company, Indianapolis, Ind., who build cars with an international reputation, are using the Drill"With the Pistol Grip and Trigger Switch" exclusively. They have over thirty of these Drills in use in their plant at the present time. It is not strange that quality tools should be used to produce





THE BLACK & DECKER MFG. CO.

TOWSON HEIGHTS, BALTIMORE, MD., U. S. A.

Portable Electric Drills Electric Valve Grinders Electric Air Compressors

BRANCH OFFICES:

New York, N.Y. Philadelphia, Pa. Atlanta, Ga. San Francisco, Cal. Chicago, Ill.

Detroit, Mich. Cleveland, Ohio Buffalo, N.Y. Boston, Mass.



## You be the Judge

We decided to manufacture explosion whistles provided we could offer a better whistle than any on the market. We put it up to our Engineering Department. After months of investigation and experiment they reported that the explosion whistles then sold had two great common drawbacks. When they were operated the cylinder to which they were attached lost its compression of gas on the compression stroke, preventing a full explosion; they permitted air to be drawn into the cylinder on the return stroke, thus spoiling the mixture of gas for the next explosion. Thus the smooth, efficient running of the motor was interfered with, and the high pressure explosion necessary to a clear, commanding signal was not delivered.

To overcome these objections, our Engineering Department designed the Brookins Automatic Explosion Whistle. An automatic ball check valve was provided between the whistle bowl and the main whistle valve. check is adjusted to hold the normal compression of gas in the cylinder until the ignition fires it. To this full explosion pressure, ball check opens—TOOT—instantly ball check closes and prevents air being sucked into cylinder on return stroke. All gas in the cylinder must come from carburetor in the proper mixture. This operation is automatically repeated on each

> The engine runs more smoothly and efficiently. The whistle gives a full, clear, commanding signal—just the kind a driver wants.

> Lay the Brookins Automatic Explosion Whistle side by side with any other on the market and tell the prospective purchaser the difference—there is only one answer: "Give me the Brookins Automatic Explosion Whistle."

You know the great demand for explosion whistles—how profitable it is for dealers to carry this popular accessory which appeals to every truck driver—every car owner.

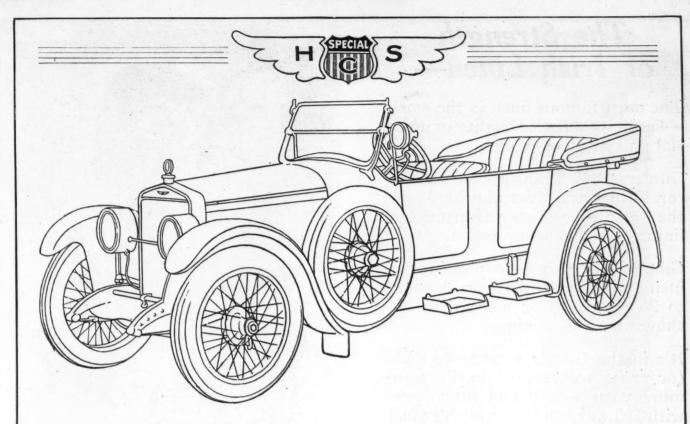
The question is, which whistle will you carry—if more than one, which one will you recommend? You be the judge.

Let us mail you leaflet describing whistle in detail.

The Brookins Manufacturing Co. Dept. B. 6, Dayton, Ohio

### Mail this Coupon Today

Whistle	***************************************	Measure	Tire Lock
Name			
Address	*		***********
	s Name		



The H. C. S. Special can hardly be compared to any motor car that has, up to the present time, been offered to the motoring public.

Built for economy, comfort and serviceability, it reflects, in every detail, the experience and ability of its designer, Harry C. Stutz, who, for twenty-one years, has designed and built motor cars that have unfailingly performed, well and long, the duty for which they were intended.

Being strictly a quality car, built on a quality production basis, backed by a long engineering and manufacturing experience, this car takes its place among the cars of the better class with the assurance that it will fulfill every requirement of the most exacting motorist.

H. C.S. MOTOR CAR COMPANY

INDIANAPOLIS, U.S.A.
HARRY C. STUTZ, President

## The Strength of Irish Linen—

The most famous linen in the world—lies in its superior quality of material and its close weave.

Gilmer "46" Transmission Lining for Ford Cars gives almost double the wear of ordinary transmission lining—for the same reason.

Gilmer "46" shows 46 picks to the inch as compared with the usual 20 to 26 picks (never more than 30) shown by other linings.

It's in the Gilmer weave—46 picks (or cross weaves) of husky four-fours yarn woven and interwoven with 130 warp ends of 5 ply 8's yarn. Ordinary looms cannot weave Gilmer "46". It takes the specially constructed Gilmer looms to produce this extraordinary density and flexibility of weave.

Gilmer is specially processed to resist oil, to prevent that "soapiness" which quickly ruins ordinary linings. This treatment makes Gilmer as nearly dust-, grit- and friction-proof as it is possible to be.

## L. H. Gilmer Co.

Gilmer "46" Transmission Lining is packed in cartons of 60 foot rolls, complete with 10 sets of rivets. Also in cartons of 10 individual sets, with lining and rivets complete for Ford Cars.





26 picks



Compare 46 to 26. See for yourself the close set, husky Gilmer weave. Compare it with the weave of any other transmission lining you please. Gilmer will show 46 picks (or cross weaves) to the inch. The other linings will show from 20 to 26 picks.



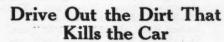
Gilmer

TRANSMISSION LINING FOR FORD CARS

## STRICKLER'S HIGH PRESSURE GREASE GUNS

Water in bearings from washings or rain breeds rust and corrosion. Clogged bearings will eat up bushings and depreciate the car at a fearful rate if proper lubrication is not given.

A grease cup is of no help if the grease in it becomes hard. It is worse than no grease at all, if it doesn't feed properly.



Strickler High Pressure Grease Guns force out all rust, corrosion and hard grease, at a pressure of nine hundred pounds at the nozzle. Clean, fresh grease is left in its place. It means that every application of grease with a Strickler gun adds to the life of the car.

Price of Gun \$3.00. Extra Nozzles 65 cents. Specify name, date and model of car when ordering.

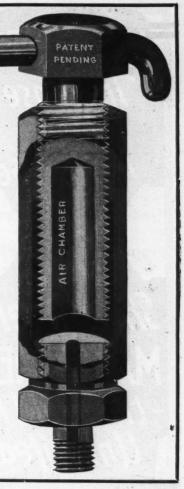


Used and Recommended by Manufacturers of Pierce-Arrow, Franklin and Many Others.

By a series of special nozzles, male and female, it is possible to use the Strickler High Pressure Grease Gun on any car. Special sets for garage use are available, making the use of them possible wherever grease cups now serve. Price \$12.00. Gun not included.



4231 Wilcox Ave. CHICAGO, ILL. THIS GUN WILL DO THE WORK.



## THE UP TO THE MINUTE PUMP

Put your Free Air to working for you



Perfectly Safe

It will handle Gasoline, Oil, Soap, Transmission Greases, Fluid and Semi-Fluid Substances
OF EVERY KNOWN DESCRIPTION.

Your Supplies are Available in every part of your Building with the Doyle System.

The state of the

The Pneumatic Appliance Co.

Williamson Bldg.

CLEVELAND, OHIO

ASK YOUR JOBBER OR WRITE TO



MAXOTIRE is a pneumatic tire reinforcement which means thousands of added miles on but little added cost. A Maxotire—with proper treatment—can be used on different tires repeatedly. Eight and ten thousand mile runs are not uncommon to Maxotire owners. tire owners.

This 36x4 tire was run and run and run on a Cadillac until worn through in several places as shown — without blow-outs. The MAXOTIRE automatically locked itself about the Inner Tube. It held the strain within itself, relieving the tire walls.

The MAXOTIRE made the tire almost puncture proof, too, and protected the tube every place. Anyone with MAXOTIRES CAN DRIVE with "peace of mind."

of course, car owners would not like to use a tire that is like this one is now— but this is a good example of what Maxo-tire CAN DO. And since Maxotire stood such a test, it surely will give the service demanded of it in ordinary motoring.

Dealers are finding Masotire a source of good profits. Sales without re-orders are uncommon. One agent has sold 18 carloads of Masotires. Write at once.



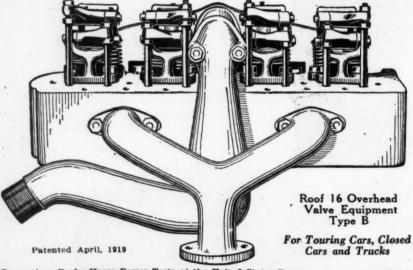
54 to 60 Channing St. DELAWARE, OHIO



#### POWER and SPEED

## Roof 16 Overhead Valve Equipment

For Ford Motors



Comparison Brake Horse Power Tests at the United States Bureau of Standards gave Standard Ford motor with regulation carburetor 13.7 Horse Power. The same motor with 16 Valve Head and regulation carburetor 22.4 Horse Power. The same motor with 16 Valve Head and Special carburetor 29.7 Horse Power. Recent tests at U. S. Bureau of Standards gave 32 Horse Power. We are Manufacturers and Distributors of speed and other specialties for Ford cars; 3 to 1 gears, high speed camshafts, aluminite, light grey fron pistons, lynite pistons, aluminite connecting-rods, racing

LAUREL MOTORS CORPORATION

spark plugs, racing carburetors, roller bearings counterbalances, wire wheels, multiple speed transmission, high tension magnetos, special oiling system, special worm and gear, steering gear, racing tires, racing bodies, hood and radiator, parts for underslinging chassis. Tell us what you want. We can supply it. Racing quality. Lowest prices. Send for our complete Literature on how to build fast cars and double the value of your converted Ford Truck and descriptive circular on Speed and other Specialties for Fords.

Anderson, Indiana, U.S. A.

### The Most Remarkable Power Device, Even in This Inventive Age

Hill Climbing for touring cars-pulling power through sand and mud-doubles the hauling capacity of converted Ford truck-speed for mile and half-mile tracks to rival the fastest cars built. Ford racing cars with our Cylinder Head Equipment and special racing parts have attained speeds from 80 to 100 miles per hour. Price, complete, \$115.00 f. o. b. factory, excise tax paid. Nothing extra to buy. Cylinder Head Equipment all ready for installation. It takes the place of the regular Ford Cylinder Head. Any mechanic can easily and quickly install it.



A. J. STEPHENS
President
A. J. STEPHENS RUBBER CO.)
Capitalized \$1,500,000,00

## DEALERS—My New Selling Plan Will Increase Your Daily Profits \$50 or More

No matter where you are located, nor how much competition you have, I can show you a most extraordinary selling plan that will actually add from \$1,000 to \$1,500 monthly profits to your business. This is no experiment. Hundreds of enthusiastic dealers throughout the country are using my selling plan and enjoying big profits. J. W. Neal of Sedalia, Mo., sold over \$6,000 worth of Stephens Products in less than a month. F. F. Swinson, Pratt, Kans., made \$400 profit in 5 days. Reinhart Motor Co., Ottawa, Kans., sold over \$2,000 worth of Stephens Tires in 10 days. McDavid Bros., Excelsior Springs, Mo., made over \$300 profit in 4 days. I can refer you to hundreds of other dealers who have done as well. This is the best proposition ever presented to you.

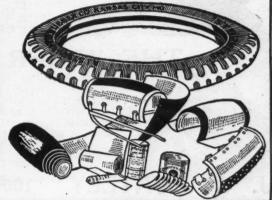
## I Will Bring a Steady Stream of Customers Into Your Place of Business

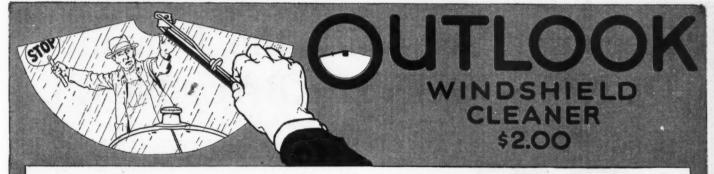
By using big advertisements in your local paper, showing your name as distributor for STEPHENS TIRES and accessories, I will bring you business that you never hoped to get. My plan is to do this advertising without cost to you. My plan is to increase your business without increasing your overhead, in other words, to positively guarantee the sale of our products. Not a cent is required until I prove my claims to you. Write me today for all information. Learn the facts, then judge for yourself as to the money-making possibilities.

## A. J. STEPHENS RUBBER COMPANY

1401 Chestnut Street

Kansas City, Missouri





## Sell the Best Known Cleaner!

Outlook is not only the best cleaner but the best-known cleaner. It has a thoroughly established trade among satisfied users. Now extensive advertising is making it still better known. Dealers are concentrating their efforts on Outlook because it fills a real need, because it has a demand established and because a satisfactory profit can be made by pushing it.

Get in touch with your jobber TODAY for prices. This is an all season seller but there's no use missing business right now when sales are easiest of all!

THE OUTLOOK COMPANY

5637 Euclid Avenue, Cleveland

#### Ought to Be Legal Requirement

Many dealers say "The law should compel the use of windshield cleaners." It's coming some day! In the meantime certain far-sighted dealers will be skimming the cream off the trade. Why not be one of them? Now is the time to make your profits!

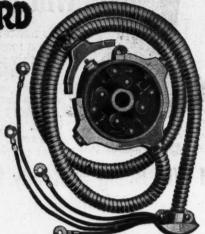
#### Feature the Outlook

Put the Outlook Cleaner in stock. Call it to your customers' attention. Feature it in the window every stormy day. Put the same effort behind it that you would put behind any active line, and you'll find it turning your capital at a mighty pleasing rate! Have you an Outlook on your own car?

## Duntley Magneto Break Timer WIRE & TERMINAL GUARD



For Ford Cars For Fordson Tractors



### TIMER

The ever-increasing demand for the Duntley Magneto Break Timer is not so much due to its superiority in design and construction as it is to the fact that it has made good, saved gas, added power, made starting easy, eliminated trouble and insured a smoothly running motor at all times and under all conditions.

No matter how much current is generated, nor how efficiently the timer operates, broken and leaky wires, loose connections and short circuits absolutely destroys motor efficiency, wastes gas, reduces power

and decreases mileage, but
The Duntley Wire and Terminal Guard eliminates the trouble
makers, for it affords absolute protection to the most vital parts
of the entire ignition system.

Dealers: Write or wire for full details

J. W. DUNTLEY 1004 Michigan Ave. CHICAGO, ILLINOIS

## Keeping Pace With the Demand DUNN COUNTERBALANCES

Can now be furnished for

DODGE

CHEVROLET 490 NEW OVERLAND 4



SO SUCCESSFUL have Dunn Counterbalances been for the past three years on the Ford motor and so well and favorably known have they become throughout the entire world that we have literally been forced to supply them for other popular makes.

And since the most calls were for the above cars, we of course will supply this demand first. Other models will follow as rapidly as we can tool up for them. It is our intention to supply them for all current models of automobiles, trucks, and tractors, where the demand is sufficient, and on which they can be used. Each individual make of motor requiring a specially designed counterbalance.

ALL THE KNOWLEDGE AND EXPERIENCE gained in making Counterbalances for Ford motors for years enables us to produce these new models correct from the start. So certain are we of their satisfactory performance that we agree to refund the purchase price if the user is dissatisfied for any reason whatsoever after using them fifteen days.

DUNN MANUFACTURING CO., Clarinda, Iowa

Dunn Sales Co., 250 W. 54th St., New York City. Dunn Sales Co., 1220 San Pedro St., Los Angeles, Cal.

COOL IN SUMMER



## THE ALVEY ALL-YEAR AUTO TOP

with four big features

The Lightest
The Cheapest

The Most Durable
The Most Noiseless

Storm Top on the Market

WARM IN WINTER

#### LIBERAL DISCOUNT TO DEALERS

ONE DEMONSTRATOR TO EACH DEALER AT COST

### **BE PREPARED!**

Order Now

Write for Prices.

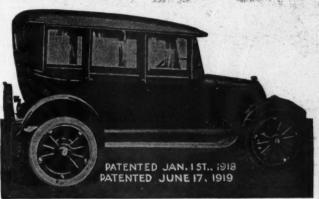
## **HUMMER**

AUTO TOP WORKS

Manufacturers of
ALL YEAR AUTO TOPS, TRUCK CABS, BODIES, SEATS, CUSHIONS
TRUCK ASSEMBLIES AND OTHER ACCESSORIES

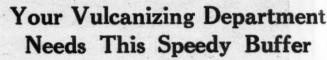
Chicago Heights

Illinois





## TIREMEN: SPEED UP SHOPPRODUCTION



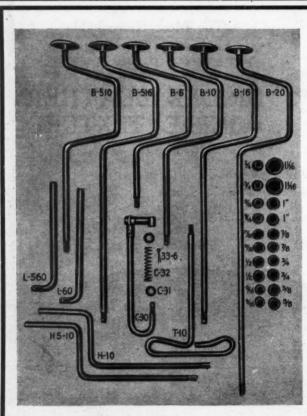
It's making a great "hit" with tire men who have been handicapped by doing preparation work with those noisy, belt driven, vibrating buffers. Direct connected, it is simple and compact, with all danger in operation eliminated. We built the motor to meet your very needs. Standard size liberal ball bearings are set in dust-proof housings to minimize friction and to insure durability. We can refer you to hundreds of tire shops throughout the country where Johnson Electric Buffers are cutting labor costs and giving increased efficiency. These buffers operate on any current. It is unnecessary to make costly connections. Either alterating or direct current may be used.

If increased production, bigger profits and up-to-the-minute equipment appeal to you, write for literature and prices.

To Distributors: Ask For Proposition.

U. S. ELECTRICAL MFG. CO. (Mfgrs.) Third and Central Los Angeles, Calif.

## JOHNSON ELECTRIC BUFFERS



Holley Garage Kit No. 10



## DEVELOPED IN ACTUAL SHOP-PRACTICE

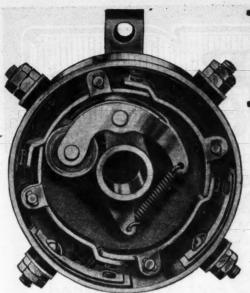
Holley Wrenches are the result of many years' contact with, and study of service station and assembly room problems.

A wrench combination perfectly adapted for the work on any motor car, with which time and labor cost to the customer may be economized, and the productiveness of the wrenches are equivalent to 68 Solid Socket types of wrenches packed in a compact tool case.

Each tool kit is provided with a twenty-socket container that makes the sockets easy of access, and avoids misplacement of any of the different sizes.

When you equip with Holley Wrenches you are making certain the attainment of highest standards of efficiency and service in your repair shop. Send today for price lists, catalog and illustrated descriptions of Holley High-Quality

HOLLEY TOOL MANUFACTURING CO. OMAHA, NEBR.



PATENT APPL'D. FOR

A MAGNETO CONTACT ACCURATELY TIMED, INSURES A PERFECT RUNNING MOTOR, ADDED POWER, AND A SAVING OF FUEL.

DUPLEX IGNITION FOR FORDS IS THAT KIND OF IGNITION; NOT ONLY WHEN NEW, BUT ALWAYS.

# Duplex Timer Fords

The Constant Accuracy of Duplex Means a Hot Snappy Spark at the Right Instant

The Duplex Double Duty Magneto Contact combines all the accuracy of the single roller with the high efficiency of the point-contact. Design based on proven mechanical and electrical principles makes the Duplex dominate the timer field.

Years of experience with Ford Timer problems are built into the Duplex. Sturdy, reliable; built of the best materials. Extra heavy, durable tungsten points. A double row ball-bearing roller of the enclosed type is the only moving member. Requires no lubrication.

The Duplex is the Masterpiece Timer. Sold only through jobbers and dealers. Dealers: If your jobber cannot supply you, write us.

THE DUPLEX PRODUCTS CO.

3520 Princeton Avenue

CHICAGO, ILL.



## The Wings Like Oars

The wings cut down edgewise into mud, then push broad flat faces against it, giving the car a forward heave. Fastened in half a minute by the turn of a wingnut. Takes less room than a wrench set. Costs half the price of a team to pull out of a mudhole—and does the trick in half the time.

BERSTED MFG. CO.



Syde-Grippers don't have to be sold. Customers are only too glad to have a pair in their tool box. They buy at sight. A Syde-Gripper on your accessory counter moves hundreds off your shelves. Find out what a wide margin of profit our agreement permits you to make. Ask about it at once.

in Water

765-771 Mather St. Chicago, Ill.



## Foil the Thief—Dress Up the Car—Make Driving a Joy

The only practical steering wheel lock is a lock in the steering wheel.

Entire mechanism of the Decker Lock-Steering Wheel is imbedded in arm of spider. It is simple, practical and cannot get out of order.

THE LOCK-Yale, of course.

THE WHEEL-17 inch finished rim.

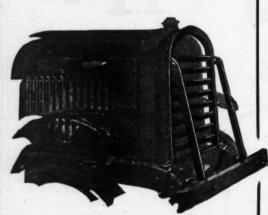
SPIDER—Cast aluminum, highly polished, strikingly handsome.

MODELS NOW READY — Ford, Dodge, Maxwell, Chevrolet 490 and Overland 4.

DEALERS: Investigate the Decker Lock-Steering Wheel. It will pay you to do so.

RICHARD M. DECKER COMPANY, 2907 Indiana Avenue, Chicago

## Does He Need Radiator Protection?—Read This!



Its forward braces will stand most terrific shocks. If they are deformed by a blow they will pull the guard away from the radiator—not push it up against the core. The bars set at 45 degrees protect against wagon poles, bars and rods. Talk to the Truck Owner Along This Line—You'll Sell Him on Plain Common Sense Argument

The accident might possibly never occur.

It might come in a few weeks,

It may happen today.

If you install the Warman Radiator Guard it can never happen.

When the only unprotected part of your truck—the radiator—is shattered or pierced—then your truck is laid up for days—possibly weeks.

It then ceases to earn money and becomes a non-paying liability.

This accident may call for a distant factory repair job it may call for the ordering of a new radiator.

You then lose the earnings of the truck for the idle period—and you pay the cost of repairs or replacement.

Foolish, isn't it, to run this risk, when for \$25.00 or \$30.00 you can be sure that nothing CAN happen to the radiator?

Be wise, equip now with a Warman Radiator Guard.

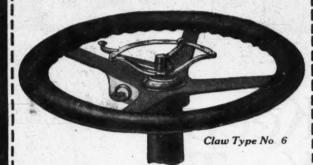
Write and we'll tell you more and show you quick sales and big profits.

WARMAN RADIATOR OF GUARD

THE FUNDAMENTAL CORPORATION
270 Union Ave. Brooklyn, N.Y.

## "24 autos stolen in last 24 hours"

THINK of it—one an hour! That's the record of one big city. Such losses are absolutely unnecessary and preventable. There's a Perry Auto Lock for every car made—an absolutely sure and guaranteed way to make automobiles safe from the cleverest auto thieves in the world.



## Perry Auto Lock \$17.50

More than a protection, the Perry Lock quickly pays for itself through the insurance it saves—insurance companies everywhere allow at least a fifteen percent reduction in theft rates when you install a Perry. Officially approved by Underwriters' Laboratories and Police Departments.



## The Perry Ford Lock

Offers all the protection of the larger types, costing only \$7.00 complete. Your neighborhood garage or repairman will quickly and easily install a Perry Lock on your car if you ask him.

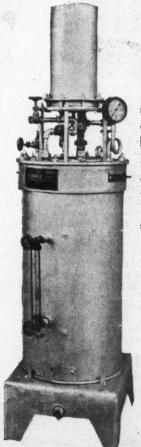
Perry Auto Lock Co. 2635 South Michigan Avenue CHICAGO

### WILD TO MAKE MONEY FOR YOU

Wild to save money for you. Wild to increase your business for you. Wild to stop the worries of your Battery Service Station.

A "Wampus Kat" is just that for putting your battery service in the highest class. Gives you distilled water analyzing 100% pure for one-half to three cents a gallon! Steams open batteries by your own method in shorter time and more thoroughly. Gives you unlimited hot water all the time. Operates most economically from gas or kerosene, doing all the foregoing with only one cost.

## "WAMPUS KAT"



## BOILERS and CONDENSERS

Designed so waste heat is less than 10%. Built for years of satisfactory service. Self-cleaning, easily accessible. Money back in 30 days (plus freight) if you don't like it. Absolutely guaranteed (except burners, not made by us) for one year. Yes, it's sure a Wampus Kat.

Made in distilling capacities of one, three, five and ten gallons per hour. State which.

Write for an illustrated folder. Correspondence from jobbers invited.

Boulton-Perrigo Mfg. Co.

1126 W. 2nd St.

Oklahoma City,

Okla.



### "I'll Haul You Out!"

Tinkering for hours with a crippled or mud-mired car is irritating and needless. Safeguard against it by always carrying along a

## BASLINE

Then you simply hail the next autoist, and in a minute or two you're on the way once more. BASLINE AUTOWLINE is the "Little Steel Rope with the Big Pull." Absolutely dependable, because it's made of the famous Yellow Strand Wire Rope. Snaps on instantly with natented Snaffle Hooks that cannot loosen. In emergeticie's can be used as skid-chain. Fits under seat cushion. At dealers, \$6.95 east of Rockies.

Powersteel Autowlock, another necessity, protects car and spare tire against thieves. Also made of Yellow Strand Wire Rope, with non-pickable spring lock. At dealers, \$2.80 east of Rockies.

Powersteel Truckline is needed by every truckowner for heavy towing. It would hold an elephant. Retails, east of Rockies, at \$11.30 with plain hooks; \$12.75 with Snaffle Hooks.

#### To the Trade:

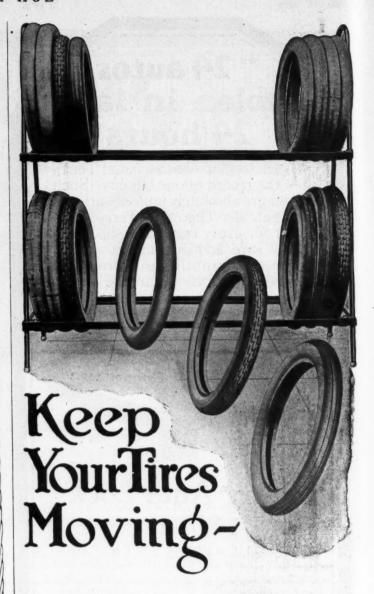
Like all widely-advertised products, Basline Autowline, Powersteel Autowlock and Powersteel Truckline are widely imitated. But there's a good axiom that can be applied to all substitutes: If the original article were not better, it would not be imitated. Push the 3 B. & B. products—they're the real thing! There is money in them for you. Write today for our attractive proposition.

### BRODERICK & BASCOM ROPE CO.

ST. LOUIS ::: NEW YORK

Manufacturers of Celebrated Yellow Strand Wire Rope—For All Industrial Uses D5E





Do you sell tires or have you "tires for sale?" The Dow Stock and Display Rack is the master salesman that moves the tire stock. Always on the job, never asks for pay. Keeps your tire stock always before the buying public, a constant reminder to your customers for more sales.

The Dow Stock and Display Rack adds neatness to your display room and gives the customer a better opinion of you. A row of them in your display room releases much floor space, saves hours a week, and permits instant deliveries.

Finish in black enamel—strong, sturdy, durable. Will accommodate any size tire. Write for catalogue.

Stocked by leading jobbers.

DOW WIRE AND IRON WORKS
Incorporated Louisville, Kentucky



# A cent's worth of insurance prevents five dollars' worth of loss

It pays you to insure your parcel post shipments of automobile accessories while in transit. So long as wrecks, fires, thefts, and other transportation hazards exist you are taking chances when you ship by parcel post or by any other means.

The cost is insignificant compared to a probable loss you might incur. You as a shipper, can protect yourself absolutely against monetary loss through a North America

### PARCEL POST POLICY

This insurance, at small cost, covers your goods from the time they leave your factory or store until they reach your customers. Five cents insures any package up to \$25 in value; ten cents up to \$50, and so on. You wrap and insure in one operation. There is no red tape.

Besides this feature of protection, North America Parcel Post Insurance is a builder of prestige and good will. It impresses your customer with the pride you take in and the value you place upon your merchandise.

It also assures him of a prompt refund of money or reshipment in case of damage to or loss of any packages in transit. It wins you more business.

Fill out and mail the coupon below and we will explain to you this form of coverage more fully.

Any agent or broker can get you a North America Policy

## Insurance Company of North America

**PHILADELPHIA** 

Capital \$5,000,000

Founded 1792

Writers of FIRE, MARINE, AUTOMOBILE, BAGGAGE, Etc. Experience, Stability, Service

INSURANCE COMPANY OF NORTH AMERICA

Third and Walnut Sts., Philadelphia.



Without obligation to me in any way, please send me full information as to how I can insure against damage or loss one hundred \$25 (or less) pareel post packages.

Name .

ress...... Sta

I would like information concerning other

nsurance, such as.....



Another Member of the Family of HOYT HELPERS

Of constant service to the repair man is this member of the Hoyt Helper Family

## HOYT CADMIUM METER AND PRODS



The Cadmium Test is the only way of obtaining accurate information regarding battery plates without opening up the battery.

#### THE TEST

A complete description of the test is impossible here—a very detailed discussion of the reason for, the method of conducting and the results obtained by making the test is contained in "THE CADMIUM TEST," a booklet which will be sent on request.

Send for new Hoyt Book "Hunting Down Electrical Troubles." Tells the quickest, most accurate way to find electrical trouble and explains the use of the Hoyt Line of Helpers

A POSTAL BRINGS IT

## BURTON-ROGERS COMPANY Sales Department

755 Boylston Street, Boston

755 Boylston Cleveland

Baltimore

Philadelphia

J. L. MADSEN New York

A. G. ADAMS Hamilton, Ont.

AMS H. JORGENSEN & CO.

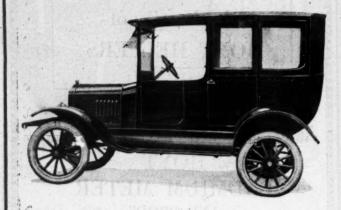
HOYT ELECTRICAL INSTRUMENTS

55 Boylston St.

lout .

New Hampshire

## ANCHOR TAXICAB LIMOUSINE **BODIES**



Quality Bodies at Quantity Prices

Maxwell — Ford — Chevrolet and Overland 4 Chassis

Built in Four Styles-Limousine Landaulet (Town Car) with Double and Single Front Seat.

> Excellent for Private as Well as Taxicab Service

Over 500 in Use in New York City

Valuable Territory Open

Let us send you our free booklet describing Anchor Bodies in detail. No obligation incurred.

The Anchor Top & Body Co. 1500 South St.

Cincinnati : : : : Ohio



EVERY FOOT of GARCO Asbestos Brake Lining you sell carries certain irresistible influences that are sure to bring the customer back when the next replacement is in order.

-Because GARCO carries definite high standards of materials, construction and workmanship quickly noted and deci-

sively proved in the way it holds, in the way it lasts, and in the absolute dependence that can be placed upon it.

Because it carries the evidence of your genuine interest and good judgment as to the kind of brake lining your customers ought to

Solidly woven-to resist wear to safeguard life-to insure satisfaction-to build business. That's GARCO.

And, we help you sell GARCO with more than high quality in the product. Widespread national advertising and sales helps in generous measure are behind GARCO and the dealers with the good fortune to handle it. Write for our sales proposition.



ASBESTOS PRODUCTS

Packings

Asbestos Automobile Specialties Brake Lining
Transmission Lining for Fords
Cone Clutch and Disc Clutch
Facings
Asbestos Spark Plug Yarn Asbestos Textiles

Cloth Yarn Cord Carded Fibre Braided Tubing



Garco Transmission Lining for Ford Cars



Garco Gaskette Roll

#### **GENERAL ASBESTOS** AND RUBBER CO.

Main Office and Factories CHARLESTON, S. C.

Branches and Complete Stocks 58 Warren Street, New York North Franklin Street, Chicago 311 Water Street, Pittsburgh

## Master Hydrometer

he Battery Cuc



## The Most Perfect Hydrometer On the Market

You are introduced here to the MASTER HYDROMETER—the only hydrometer that provides instant and accurate reading of battery solutions.

This accuracy and superiority of the MASTER HYDROMETER has been demonstrated to the satisfaction of jobber, dealer and user. The MASTER has also re-ceived highest endorsements from the largest battery concerns in the country as being the nearest to perfection of any Hydrometer on the market.

This perfection is secured by the addition of celluloid rings to the float (see illustration.) Note how the studded celluloid rings keep the tip from sticking to

the tube. See how the solution is permitted to flow past the float between the four studs on each ring making it possible to secure an instant, accurate reading, practically impossible with old style instruments.

Other special features which add to the worth of the MASTER HYDROMETER are the heavier and larger glass barrel and large rubber rings at each end which afford protection against breakage. Also bulb and nozzle are made of specially prepared rubber.

## Dealers—Note This

There is a generous cash profit in the sale of the MASTER HYDROMETER—and a much larger profit in the goodwill of theman who buys one. Sold at a price that will easily compete with the ordinary type hydrometer that lacks these exclusive features.

To Car Owners

Resure to get a

Writeus today. We handle the largest accessory line in the world. The Hydrometer is just one of thousands of excellent pro-ducts wesell. Send the cou-pon and secure a copy of our large general catalog.

Be sure to get a
MASTER HYDROMETER. If your
dealer is not supplied send us his
name and we'll see
that yourwants are
taken care of.

## The Beckley-Ralston Co.

1801 S. Michigan Ave., Chicago, Ill., U.S.A. New York Detroit San Francisco Pittsburgh Kansas City

THE BECKLEY-RALSTON CO.

Dept. A, 1801 S. Michigan Ave., Chicago, U. S. A.

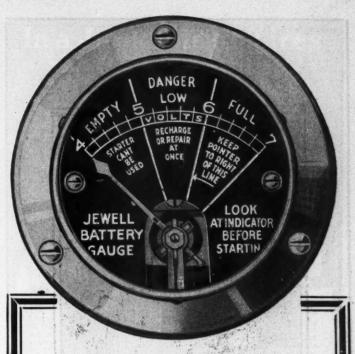
Send at once prices, discounts and full information regarding the Master Hydrometer. Also send us your latest catalog and discount list of Automobile Accessories.

.....

Name .....

Address

Exclusive



## Jewell Battery Gauge Takes the mystery out of the Battery

The Jewell Battery Gauge tells the exact condition of the Battery at all times. It tells this not only in figures, but in plain every-day English-no guesswork or room for doubt. It is always on the lookout, ready to warn of coming trouble.

It continually reminds the driver of the battery's condition. Reminds him every time he steps in the

#### The Only Successful Battery Gauge on the Market

It is successful because it is the most efficient, the most dependable. It is successful because it is the only Gauge that records the battery condition in plain English.

When the voltage is low the indicator points to the word "Danger." It tells you to "recharge or repair at once."

This Battery expert reduces battery expenses. It eliminates many delays. It is a finished accessory. An absolute necessity to every car owner.

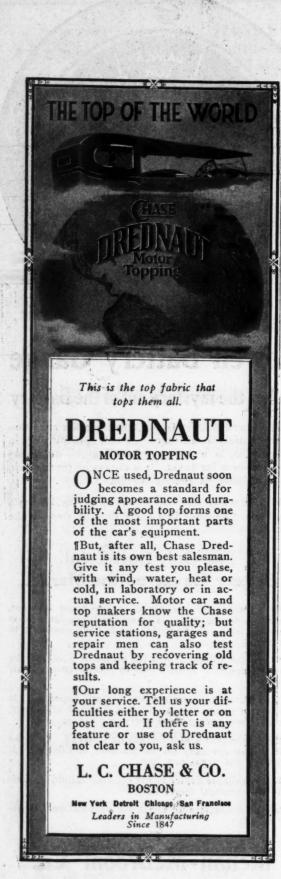
Dealers report a fast increasing demand. It is the best selling specialty on the market. A valuable addition to the accessory line.

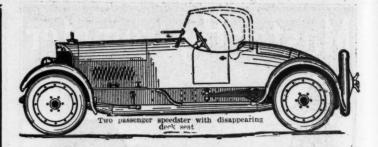
Every reliable dealer in the country should investigate this unusual opportunity.

We offer Dealers an attractive proposition. Write for it today.

Mehan-McBroom Co.

1301 Michigan Ave. CHICAGO, ILL.







Unexcelled in superb finish and skilled workmanship.

A motor car distinguished from all others in design throughout. A pleasure vehicle for those who discriminate and demand distinctiveness.

We specialize in individual design.

Open models, \$5,800.00 and up; closed models, \$7,400.00 and up.

Agency inquiries given prompt consideration

SINGER MOTOR CO., INC.

North Third Ave.

Mount Vernon, N. Y.

The Peerless Blowout Shoe Has no Equal!

Do not confuse the Peerless with the ordinary blowout shoe. The Peerless is new and different and gives from 800 to 2,000 miles of guaranteed service. Made of heaviest sea-island cotton fabric in several layers and tailored to fit the tube. Laces on the tube and relieves the injured casing of all strain. Millions have been sold already.

Quick Sales Big Profits

Dealers, everywhere are finding quick and easy sales for the Peerless Blowout Shoe. Our special co-operative plan helps you sell them and brings customers right into your store asking for them.

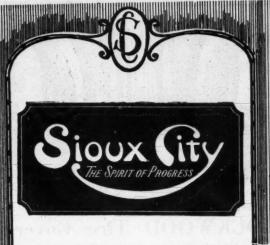
Write today for special offer and particulars of our Co-operative Sales Plan.

PEERLESS

MFG.

CORPORATION

1522 St. Louis Avenue, KANSAS CITY, MO. "Tailored to Measure" Fits Perfectly



## Means Harmony in Industry, Because—

Sioux City is an *Industrial* Center, Plus. It combines the power of a center of industry with all those fine things that make city life worth living.

The great army of labor in Sioux City, and the captains of industry that direct its efforts, are contented and their relations are harmonious.

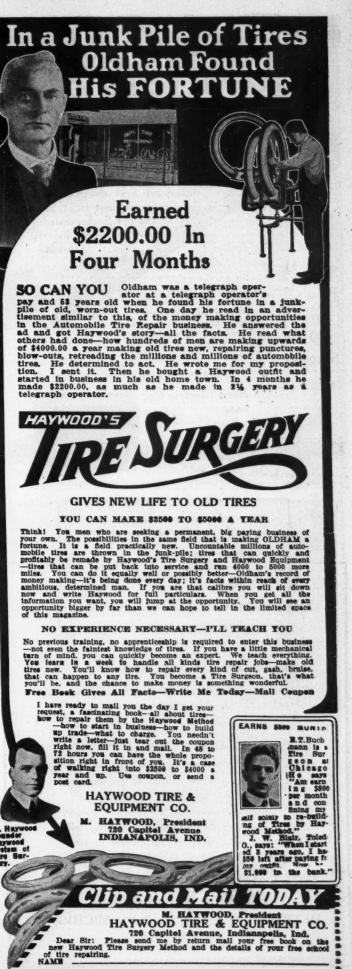
Homes that are real homes, parks and lakes and golf courses and other means of outdoor recreation, colleges and libraries, theatres and concert courses—all these bring the comforts and conveniences of life to all in Sioux City.

Locate your plant in Sioux City—where culture and industry progress hand in hand.

Write us for booklet describing living conditions in Sioux City.

Chamber of Commerce Sioux City, Iowa





# SODERWAND

"Solders Like Magic"

Speeds all soldering and works easier and quicker because lighter, better balanced and shaped. Electric arc—greatest heat known—makes Soderwand ready for work in 40 seconds.

Solder

in

40

Seconds

Standard
and special
points fit every
job. Nickeled, seamless steel tubing, convenient thumb-switch.
110-220 A.C. or D.C. For
best results use Baco Carbons.

Write for prices today.

Baco Electric Co.

Bode lov



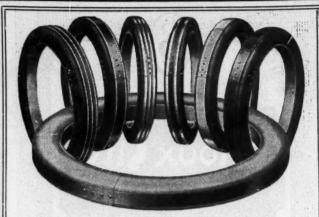


Among the many, there are two dominant reasons why you should push Defender Shock Absorbers.

They net larger dealer profits and give Ford car owners the best by test combined shock absorbers and snubbers made.

A new Defender Shock Absorber folder, as well as our Dealer proposition, will interest you. May we send them to you?

DEFENDER AUTO-LOCK CO.
5th Floor, Marquette Bldg.
DETROIT. MICHIGAN



#### LOCKWOOD Tire Covers

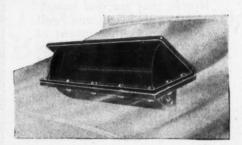
Protect spare tires from depreciation and give cars a distinctive appearance at minimum expense. Fit any make of tire with glove-like smoothness regardless of style of tire carrier used.

SOLD BY DEALERS EVERYWHERE

Dealers: Write to Dept. E of the Kansas City office for the new Lockwood catalog



AUTO FABRIC ACCESSORIES DIVISION BAKER & LOCKWOOD MFG CO.



## The Petry Ventilator

Throws a cooling air to that overheated place, the floor up under the cowl. The heavily nickeled, solid brass knob on dashboard regulates quantity of air wanted. The adjustable baffle-plate throws the air to any desired point. The Petry Ventilator adds snap to the appearance of any car. Easy to put on. Bolted through the cowl to a sub-base. kigid, dust-proof and waterproof when closed. Handsomely designed with beautiful lacquered finish. The only stock ventilator adjustable to the curve of any cowl. Indispensable to closed cars. Special type for Fords, \$3.00. Universal type, applicable to any shaped cowl, \$5.00, including installation tool. Write for literature.

N. A. PETRY & CO., Inc.
340 N. Randolph St. Philadelphia

Makers of the Petry Cut-Out and Pedal

#### DISTRIBUTORS

Gray-Heath Co., 1440 Michigan Avenue, Chicago, Ill. Norman Cowan Co., 445 Rialto Bldg., San Francisco, Cal. J. W. Van Degrift, 627 Charles Bldg., Denver, Colo.

## Because you'll make more money



That's why we ask you to stock A-B-C Fibre Sheet Packing.

It will not soften or rot under conditions which would render useless other sheet packings-it will not

"squeeze" out. It is proof against the action of water, oil, greases and gasoline, and is tough as rawhide.

But it is not only the quality that will increase your profits-it is money saved for your customers that will swell the net.

A-B-C Fibre Sheet Packing is lighter in weight than other packings. It is sold by the pound and so its weight saves money as it cuts more gaskets per dollar spent, than with other sheet packings.

Stock A-B-C Fibre Sheet Packing—also A-B-C Brake Lining—A-B-C Fan Belts—A-B-C Radiator Hose—A-B-C Clutch Rings. Write for prices.

AMERICAN BRAKE-LINING COMPANY Lansdale, Pa.



understand the operation, care and repair of autos, trucks and tractors. EARN \$100.00 TO \$400.00 MONTHLY

Our Course successfully teaches the Auto and Tractor business. It qualifies you to fill any position—successfully handle any job. Most complete, practical and up-to-date Course known. Every phase of work covered. Actual experience given on tozens of different cars. Our entire equipment is best obtainable. Brazing, Welding and Tire Repairing taught in separate Courses. Our Graduates given preference everywhere.

Unlimited Opportunities—Start Business of Your Own. Hundreds of our students go right from Our School into pushness of their own—many of them and never become their expectations all because of the training received from the M. S. A. S.

Big Factories Endorse Our School. The thoroughness of our newell known in the Auto Industry. The biggest factories in the Country heartily endorse our Course. In fact, many of the leading Auto Manufacturers assisted in outlining our Course and they give our Students the fullest cooperation possible. These factories are constantly calling on us for graduates because they know the type of men we turn out.

Start Any Ilme. School open all year. No need to waste time. Instruction can begin same day you arrive. Three classes daily. Students aided in getting jobs to help pay expenses when necessary.

Write for Free Catalog. It tells the complete story of our School and several Courses. Gives names and quotes dozens of letters from our thousands of graduates. Contains 175 pages of valuable facts. Write today, or better still, jump train and come, as hundreds have dozen.

MICHIGAN STATE AUTO SCHOOL 7606 Auto Building Ostroit, Mich. U.S.A Woodward Ave.



## WALLER CUTOUT Makes Buick Step Out

Adds power, speed and endurance to all models including 1918. Sells with practically no effort because of the many other advantages offered.

Replaces test plug in exhaust pipe with 15 minutes' work. Operates at touch of finger. Provides free passage to blowout carbon. Proven practical in long hard service. Machine ground cover face is gas tight. Long levers make operation easy and positive. Bell-shape prevents fouling or clogging. Great aid in locating

and preventing engine trouble.

Adds greatly to power. Indispensable in hilly country.

Write for illustrated folder.

WALLER CUTOUT COMPANY

IOWA DELWEIN



Southwestern:

### INCREASE SAMSON SALES



Adding the Perfect Samson Cab and Samson Bodies to your line multiplies the number of your sales. Your customers find the efficiency of both truck and driver increased. The extra profits they make bring extra profits to you. Quick deliveries.

Inquire right now about the money-making features of our line.

#### KENNEDY CAB & BODY CO.

OFFICE
Lewis Building
Minneapolis

WAREHOUSE
112 Third Avenue, No.
Minneapolis

Distributor:
Jos. A. Carson,
P. O. Box 1844,
Tulsa, Okla.

Oil and Gas
Tight

PERMASEAL

I N addition to the
fact that PERMASEAL Piston Rings
return dealers the
largest profit and are
as easy to fit as an
angle-cut ring their

Pacific Coast Distributors:

Western Agencies Company,
285 Minna Street,
San Francisco,
Cal.

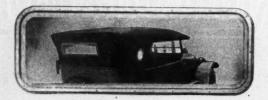
return de alers the largest profit and are as easy to fit as an angle-cut ring, their patented interlocking, dovetail joint actually does create a perfect piston ring seal. Garagemen order from your dealer. Dealers get in touch with your jobber. Jobbers, our proposition is to your advantage.

GRUNDY MFG. CORPORATION DETROIT, MICH.





### QUALITY—BEAUTY—SERVICE



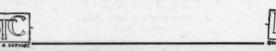
THE IMPROVED PIONEER CURTAIN LIGHTS are distinguished by their quality, their beauty and their service.

One of the main contributing factors, of course, is the quality of material used. Another is expert workmanship. These factors combined with nearly fifty years' experience in the manufacture of curtain lights, assure the consumer of the maximum of QUALITY, BEAUTY and SERVICE.

Sold by Jobbers-Everywhere

## The Brewer-Titchener Corporation

Cortland, New York



### Quick Turnovers Plus Larger Profits— With

### The L & L One Piece Transmission Lining

Sell the L&L one piece transmission lining from the accessibility standpoint. L&L time for replacements is about one-sixth of the time used with rivets and gaskets and you don't even have to take off the transmission cover to put it on.

L&L linings completely eliminates chatter—so easily installed that they may be carried as a spare part.

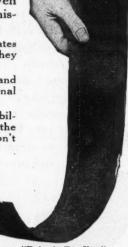
Your profits are larger, new and repeat sales greater, from personal recommendation.

Let us show you the selling possibilities and liberal discount of the L&L transmission lining. Don't overlook this opportunity.

L & L AUTOMOBILE ACCESSORIES CORP.

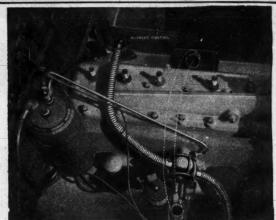
4 West 125th St. New York City





"Patents Pending"

TEXNISMISSION FINITION OF THE



Installation of a Chalmers 6-30 Model 35-A

#### CRANKCASE DISTILLATION

AND
THE THINNING OF THE MOTOR OIL

—ELIMINATED—
BY INSTALLING

## Protect-O-Motor

"HOT SPOT"

A Consequent Increase in Gasoline Mileage and Cleaner Spark Plugs

FOR ANY CAR, TRUCK OR TRACTOR.

Some Desirable Territory Open.

J. S. LOSEE

HEBRON, ILL.

## DOVER Electric Light Bulb Cases



Carries 5 extra Lamps in a small seamless Steel Box, securely held in place by steel springs.



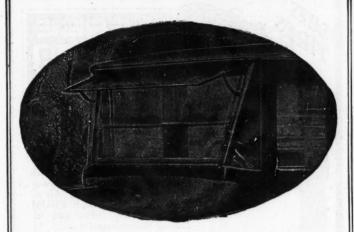
Pat. May 22, 1917
Carries 2 extra Lamps in a small steel cylinder tube.
Bulbs carried in either style of above cases guaranteed against breakage.

Send for Catalog

#### DOVER STAMPING & MFG. CO.

385 Putnam Av., Cor. Pleasant St., Cambridge, Mass., U. S. A.





## Crystal Sheet Glass

The most practical flat glass for closed cars or body fittings. It is lower priced than plate glass and is just as serviceable.

It can be furnished in thicknesses not exceeding as".

By Government Test 3" Crystal Sheet Glass is stronger than 4" polished plate.

We make thin glass for Headlights, Clock Faces, Speedometers, Oil Gauges, etc.

#### American Window Glass Co.

General Offices: Farmers Bank Bldg., Pittsburgh, Pa., U.S.A.

## THE O'BRIEN MOTOR BLOCK SUPPORT



Endorsed by all Auto Mechanics

## USE IRON— SAVE MUSCLE

With the O'Brien Support an Engine Block can be instantly positioned for any operation and securely held in that position.

An ideal Support for holding Motor Block in position while adjusting Magneto.

Order from your Jobber or write us for full information.

### THE O'BRIEN MFG. CO.

Broadway Bank Bldg. Denver, Colorado

## The Vulcan One Cure Retreading Mold



With a sufficient amount of "Energy and Pep" on your part, ONE Vulcan "One Cure" Retreading Mold is capable of making you a NET PROFIT of \$40 to \$50 per day. Four

Molds handle all popular size tires from 30x3 to 37x5. You can start to make BIG PROFITS with one Mold. Let the profits from one Mold buy the other three Molds. It takes but 45 minutes to Retread a tire the "Vulcan Way." Why spend  $2\frac{1}{2}$  or 3 hours with other methods?

If you desire, Vulcan Molds are sold on a Time Payment Basis. Send for complete information and sample of work.

## A. B. LEGNARD CO.

Madison and Sheridan Sts., Waukegan, Ill.





## The Real Blow-Out Patch

Wilson's SlaPatch—Price \$1.00—is practical—simple—easy to apply—and 100% efficient. No tools needed. Can be put in in a jiffy. Requires no skill to apply. Holds edges of tread securely. Hole cannot enlarge. Automatically vulcanizes itself to casing. In short, SlaPatch is a real blow-out patch. Used to prevent blow-outs, it will add many hundreds of miles to casings. Fits any size tire.

Dealers and Jobbers who don't sell them, write at once for details of our sales plan.

## THE WILSON RUBBER CO.

DES MOINES, IOWA

MORRIS-MITCHELL CO.,

Sales Dept.
Youngerman Bldg., Des Moines



## CURTIS AIR FREE FROM OIL

#### Business - Building Service

Drivers of cars appreciate the superior free-air service you can render with the Curtis Air Compressor. They know Curtis Air — clean, pure and FREE FROM OIL—preserves tubes and increases tire mileage.

Curtis Air-Free From Oil

The number of Curtis Compressors in use today is unquestionable evidence of their distinct superiority. The Curtis, with its exclusive, patented, controlled splash-oiling system, is the only compressor so designed to prevent oil from being forced into the air line.

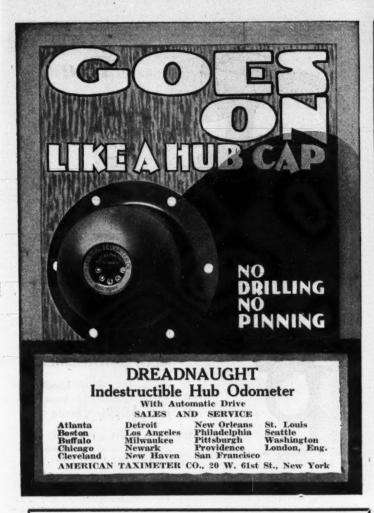
#### Ask Your Jobber

There is a style Curtis Outfit to meet your particular needs. Ask your jobber for full information, or write us.

Curtis Pneumatic Machinery Co. 1527 Kienlen Ave. St. Louis, Mo.

Branch Office: 530-H Hudson Terminal, New York City





## This All-Metal Brace Wrench Is the Recognized Standard



Leading tire and rim companies use Walden-Worcester brace socket wrenches as standard equipment.

Only one size nut on any rim, so this tool fits all requirements of any car.

When you buy a wrench for your rim, look for the name. Walden-Worcester, stamped on the tool.

We specialize in socket wrenches for every motor necessity. Write for catalogue No. 50.

#### WALDEN-WORCESTER

INCORPORATED

General Offices and Factory, WORCESTER, MASS.

CHICAGO Monadnock Bldg

SAN FRANCISCO 487 Monadnock Bldg.

NEW YORK 295 Broadway

## RAY Storage **Batteries**

Owing to the increase in production, we are able to place a few more dealer contracts.

#### RAY STORAGE BATTERIES

are guaranteed for 2 years. Our guarantee is absolute.

#### LIST PRICES-

All 11 plate, 6 volt	\$28.00
All 13 plate, 6 volt	32.00
All 12 volt batteries	38.00

Dealers write for territory.

## RAY BATTERY CO.

19 Sibley St.

Detroit,

Michigan



### When You Visit Buffalo

When in Buffalo, stop at the Hotel Lenox-Buffalo's ideal hotel for motorists. Quietly situated, yet convenient to theater, shopping and business districts and Niagara Falls boulevard. Firstclass garage.

European plan. Fire-proof, modern. Unusual cuisine. Every room an outside room.

#### \$2.50 per day up

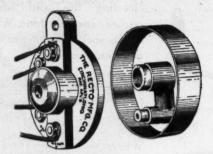
On Empire Tours, road map and running directions free on request.

> C. A. MINER, Managing Director Buffalo, N. Y.

North Street at Delaware Ave.



## **Recto Timer**





THE non-pitting, special alloy brush has lubricating qualities that eliminates oiling.

This it derives from the combination of the metals—copper, lead, nickel and graphite. This sort of metal will not plit the bed, as steel brushes do. The brush gives 10,000 mile service,

The contact bed of the timer is moulded of Formica. It can be soaked in oil or water for a week without becoming pulpy or warped. Another feature is the placing of the terminal caps away from the fan belt's swipe.

The Recto is simple. It needs no oiling. Fits any Ford model. Dealers and Jobbers. write for liberal sales proposition. 20,000 now in use.

The RECTO MANUFACTURING CO., CINCINNATI, OHIO At 23 West Third St.



The Renson Connector

ADAPTS RENTAL BATTERIES TO FIT ALL CAR CONNECTIONS

#### JOBBERS WRITE NOW

There's a big demand for, and a handsome profit in this wonderful little item. Your trade will appreciate your showing it to them.

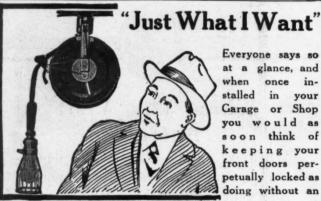


hows Connector as with large Taper.

#### **DEALERS, BATTERY** MEN. GARAGEMEN

If your jobber doesn't handle the Benson Connector, he soon will, but in the meantime, write us.

BENSON ELECTRIC CO 704 Southwest Boulevard KANSAS CITY, MO.



Everyone says so at a glance, and once stalled in your Garage or Shop you would as soon think of keeping your front doors perpetually locked as doing without an

## Automatic Extension Reel

For Electric Lamps

Take your lamp to any part of your Garage or Shop, locking and unlocking at any desired point.

Automatically rewinds the cord when you are through with the light.

STRONG AND DURABLE. Send for full particulars and prices. Remember that it is not in any way a "half-baked" proposition nor an amateur outfit, but a splendidly con-structed and practical piece of mechanism for men who haven't got time to bother with nonsensical makeshifts. Equipped with 25 feet packinghouse cord, handle, socket and lamp guard.

APPROVED BY THE UNDERWRITERS

The Cincinnati Specialty Manufacturing Company

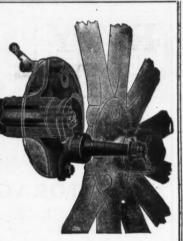
Sole Manufacturers and Owners of Patents
ers Street CINCINNATI, OHIO 1903 Powers Street

BRANCH OFFICES:
1101-05 Race Street, Philadelphia 39-41 Cortlandt Street, New York
76-78 Pearl Street, Boston

Can You Handle State or County Distribution?

The SLIPON

> **EMERGENCY** Repair Axle for Fords Offers You Unlimited Possibilities.



With a Slipon Emergency Repair Axle in the tool box there need be no doubt in the Ford owner's mind about reaching his destination.

When the break does come, the Slipon Emergency Repair Axle eliminates the call to the garage, and a tow in for repairs, and makes it possible for the driver to make his own repair—quickly and easily—and be on his way in ten minutes.

Slipon Emergency Repair Axles sell for \$6.00. There are many of them carried on Ford Trucks and Cars, and whenever used have demonstrated their usefulness as an emergency device without a doubt.

There is a big opportunity for State and County distributors in the Slipon Axle, and we shall be glad to explain our proposition to those interested in handling one of the best profit producing devices on the market. Write today.

#### THE SLIPON COMPANY

Manufacturers

Milwaukee

Dept. A

Wisconsin





Provides positive forced lubrication to all parts of Ford engine. Installed in twenty minutes, outlasts the car, and makes it live longer. Its advantages make it sell easily, our advertising makes it sell often, and liberal discounts make every sale worth while. Write.

AUTO ACCESSORIES MFG. CO.

509 Mulberry Street

DES MOINES

IOWA



For tourists, or the driver, after a change of tire, or engine trouble, will want to wash up.

This generally happens where there is no water about.

A can of Uzum, in the automobile, is equipping the car with a wash basin, running water and soap. Grease and grime simply glides off the skin, when rubbed with Uzum. The first buyer will bring in a dozen others.

Sells at 15 cents for 8-oz. cans, and 25 cents for 16-oz. cans, larger sizes proportionately cheaper.







**Jobbers** Dealers "An Absolute Necessity"

Say Users Referring to

## Pedals for Fords

Dealers-Order from your jobbers.
Jobbers-Get in touch with us.

HILL PUMP VALVE COMPANY

Belmont and Knox Aves, Chicago, Ili. Sales Dept., THE ZINKE Co., 1323 S. Michigan Av., Chicago

Price

\$1.25

#### **ECONOMY** STRENGTH SPEED ROGERS ALL STEEL TRAILERS



All Types

Write for Catalogue Y

ROGERS BROTHERS CO.

ALBION, PA.

#### A Milling Machine With Compound Table From Your Drill Press

The Davis Milling Attachment for Drill Presses makes it possible to do more work, in a better way, than is usually possible with limited shop equipment. It also adde the equivalent of an expensive milling machine at only a small fraction of the cost of the larger machine.

Just the Thing for the Repairshop

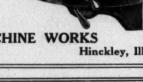
Attaches to any upright drill press with from a 14 to 42 inch swing. Cuts straight, taper and halfmoon, or Woodruff Keyseats, mills cams and cuts clutch jaws.

No repair shop or service station should be without this money making attach ment. Also made for lathes. Write for complete details.



East Lincoln Avenue

Hinckley, Ill.





BATTERY SERVICE STATIONS & GARAGES!

HIGH RATE CELL **TESTER** 

Will locate sick or dead cells at ence. Will instantly show true condition of battery without its removal from car.

PRICE \$11.00

W. F. PRICE STORAGE BATTERY CO.

Everything in Battery Parts and Shop Equipment. Send for complete catalog.

1616 No. Broad St. PHILADELPHIA, PENN.

#### LOWNSBERY EXTENSION HANDLE

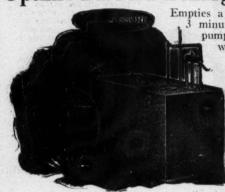
SAVES TIME AND TEMPER



A drop forged, hook-on extension handle for flat wrenches and tools. Price: Plain, 75c; Nickel, 90c. From your dealer or direct.

Gardner Specialty Company Pennsylvania Scranton

**Optimo Barrel Discharging Bung** 



Empties a barrel of oil in 3 minutes, without any pumping or any work whatever. Air pressure does Air the work. Price \$10.00 complete with 24 inch flexible metal conveyor tub-ing. Money back guarantee. Order today.

> I. A. MORGAN CO., Inc. 9 Pearl St., Brookline, Mass.

## Universa

**Profitable** Service Tools

With this jig all connecting rods can be aligned perfectly whenever motors are overhauled—slaps and knocks remedied and service standards raised. Thousands in use—considered an indispensable tool in the progressive garage.

The Vise holds pistons from 2% to 4½"—of inestimable value when reaming for oversize pins or installing new bushings.



Universal Connecting Rod Aligner. Price \$65.00



Adjustable Piston Vise:

THE JOHN DEE TOOL CO., Rock Island, Ill.





### H B BATTERY CHARGER

HB Chargers have no burn-outs—no expensive renewals—nothing to wear out or break. You charge batteries for 10c to 15c each—customer pays 75c to \$2.00. Figure those profits! Will charge 6-volt, 12-volt or 24-volt batteries at one time. No electrical knowledge needed to install or operate. Small cash payment—easy monthly terms—absolute money-back guarantee. Ten days' free trial.

There is an HB Charger for any size battery business. Sizes to recharge 8, 16 and 32 batteries. Choose the size you need — write T O D A Y for full information.

HOBART BROTHERS COMPANY Troy, Ohio Box A-64

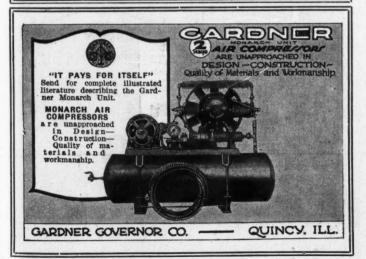
Successful Manufacturers Since 1893.



The Cherokee Guide for the Fordson lets the farmer do his own and a hired man's work with no extra effort. Farm labor is so caree that this makes the Ford-son owner buy Cherokee Guide on sight.



Sales are many, quick, satisfactory to you and your customer. Our terms assure a good profit on every sale. Act at once to get this business. Write us right now.





LOOKS SPEEDY SPEEDY

#### FOREIGN Model DESIGN

just like you have always wanted. Long sloping hood-streamline cowl -receding rear end-low comfortable seats. Will fit any Ford chassis.



#### RACING BODIES

are made exclusively by us. Our designs are patented. They are taken direct from world's champion racers. When you own a PACO you have a classy, comfortable, quiet-running speedster.

#### New 1920 Improvements

have made the bodies more attractive, more easily mounted, easier to drive and more durable. Let us send you our new descriptive literature. Get your PACO in time to get a full season's use of it during 1920.

## PACO MFG. CO.,

Peoria

Illinois

Dept. 201



### A Better Vise for Garage Use

Here is a vise for which every garage and repair man has long felt a need—a vise for holding round (or square) parts. It has a range from a minimum capacity of 1/4 inch to a maximum capacity of 45% inches.

## MESSENGER'S

successfully holds pistons, gears, Ford transmission drums, wheels, wheel hubs, differential housings and axle, crank, cam and drive shafts. It is indispensable as a drill press vise.

Easily and quickly adjusted to any size. Two sets of jaws are furnished with each UNIVERSAL VISE—one set for smooth, polished parts and one set for ordinary, rough usage.

Weight of vise, 50 pounds. Price to dealers only \$35.00.

Garage Men! You cannot afford to be without Messenger's UNIVERSAL VISE. Order from your jobber or write us for full information.

Auto Metal Parts Company 624 E. Locust Street DES MOINES, IOWA

Gasoline-proof Oil-proof Grease-proof Water-proof



Cut it with knife or shears. Note how easily and quick-ly a perfect gasket takes

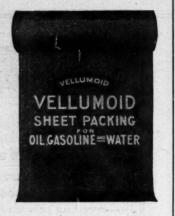


Run a finger nail over it. Note its great compressi-bility. This is what in-sures tight joints.

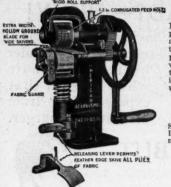


Requires no shellac; lies flat. It makes ideal replacement gaskets.

FINISHING CO. 73 Tremont St., Boston, Mass.



#### NEW IMPROVED WIDE BLADE FABRIC SKIVER



For skiving down the piles of pulled tire fabric for reliners and shoes. A simplified, practical machine that is a real repair shop necessity. Does the work in about one-tenth the time it takes by hand, and does it neatly. Adjustable to skive up to five ply.

Order one today to secure immediate delivery.

Send for our tire equipment catalog. Lists everything needed to do the work neatly and quickly.

R. T. SALES CO.

3843-47 W. Madison St., CHICAGO, ILLS.

### STILES ADJUSTABLE EXPLOSION WHISTLE

Installed in place of priming cup except on Fords where special adapter in connection with regular spark plug is used. A few turns of the cylinder give any desired warning tone regardless of motor speed. Installed by anyone. No mechanical work. Operates by cord attached to dash or steering column. Price \$4.00.

Dealers, if your jobber cannot supply you,
Write direct to us.



STILES MFG. CO.

Missouri



DUTY TRUCK-Two-Ton Capacity-\$1490 f.o.b. Factory

DUTY MOTOR CO. Greenville

Stop Worrying About Fire and Explosion! Equip Your Car with



The time-proved receptacle endorsed by big automotive engineers.
The finest seamless drawn steel, and
tested—absolutely leakless—they carry
your "gas" as it should be carried

JANNEY, STEINMETZ & COMPANY

Main Office, Philadelphia New York Office, Hudson Terminal Building



The Sign of an Authorized Distributor

Every United Motors Service Branch and Authorized Distributor carries complete stocks of genuine Delco, Klaxon and Remy parts.

Illinois

## NITED MOTORS SERVICE

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INCOMPARABLE engine ability, axles, springs, brakes and frames of the best material, and above all, unexcelled workmarship, characterize KISSEL TRUCKS.

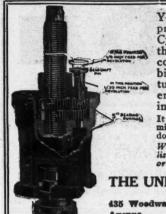
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Kissel Motor Car Company

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You can judge the accuracy and practicability of the Universal Cylinder Reboring Tool from the fact that sixteen of the country's best known automobile, truck and motor manufacturers have advised their dealers and service stations to use it in the repair work.

It rebores any cylinder in about 20 minutes. That means big profits doesn't it?

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THE UNIVERSAL TOOL CO., Inc.

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"We will replace free of charge any Dural Antimony Red Tube leaking at the splice, leaking at the valve joint, porous or out of shape, if it is returned to us within one year from date."

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Long experimentation has developed the perfect me-chanics' soap, the name is

#### **CHAUFFEURS**

It instantly removes all grease and grime, the easy scientific and harmless way.

Our Slogan Not "Just as Good" but "THE BEST"

Ask your dealer or send 10c for your first cake.

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Finished Shipped Shipped gives an absolutely correct check on every job, from start to finish. Eliminates idling, slowness, and shows up inefficient workers. Decidedly useful for timing orders, letters, shipments, etc.

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**National Bodies** Sell Themselves

They combine beauty, luxury and comfort—all the appointments of higher priced cars—and lend a dignity to the appearance of the Ford that is instantly appreciated.

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BALL THRUST BEARINGS manufactured to your exact requirements.

"STAR" BALL RETAINERS for thrust, magneto and cup and cone bearings.

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(23)

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These tires are made with a fine attention to detail and represent a very high mileage "buy" to car owners who know that the first cost of a tire can only be estimated by the miles-per-dollar formula.

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"Count every drop of gasoline and make every drop count." Ask us about special models for Fords and Maxwells.

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Manufacturers of Quality Instruments of Carburetion



GET ONE

When you have an ATSCO Portable Air Tank in your emergency car a tire can be filled in a few seconds. Outseconds. Out-fit comes ready for use. 250 lbs. working pressure.

\$40 complete Let Us Send You Booklet.

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practical, easily attached cigar lighter for the autoist. Retails at \$5.00, with attractive discount to dealers.

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11/2, 21/2, 31/2 and 5 Ton WORM DRIVE Models Write for full information

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W watts, 30 volts, \$85.00 175 wells, 36 rolls, \$85.00 SHIPPING TERMS: 25% depoil required on all orders. AL SH well, 42 \$110.00 CHAS. H. JOHNSTON, Box 20, West End, Pittsburgh, Pa.



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Surpassing excellence in all its qualities, features and acts of performance is the kind of value and service that makes the Stephens the Salient Motor Car.

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of Moline Plow Co.

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Makes Your Brakes Safe, Silent and Sure

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SAME LIGHT AT ALL SPEEDS

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ASK FOR A FOLDER TODAY.

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# SPEEDWAY BODIES FOR FORDS



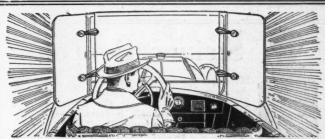
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Underslung Parts with Body
Underslung Parts Alone, \$12.50

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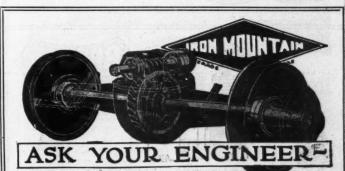
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Try 2 or 3 sections over any old blowout. Can't have blowouts, punctures; neither can the rubber wear off.

Special prices to those in new territory
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Works successfully with aluminum, copper, iron (gray, malleable, or galvanized), tin, zinc, lead, or brass. Repairs can be made with Alumiflux without removing parts from the

Not effected by heat or cold, gasoline, oil or water. Will stand heat up to 600 degrees, and pressure to 250 pounds. Write for particulars.

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Motor Truck buyers of today insist on having trucks economical in operation and with low up-keep cost.

STANDARD Motor Truck engineers have accomplished these results by selecting the best unit in each individual line, and incorporating these units into a balanced track

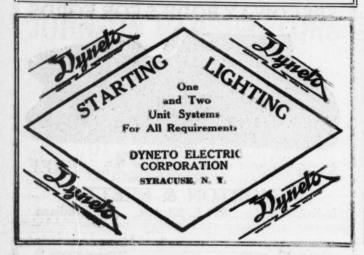
design.

Dealers write for information regarding available STANDARD territory.

A complete line of Standardised Quality Trucks.

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"All the name implies"







Motorists throughout the country appreciate the necessity of careful battery attention. The Steiner Hydrokit meets the demand for a

tainer. Dealers everywhere are pushing our product.

If you are not among them, write today for prices and discounts.

THE STEINER MANU-FACTURING CO.

New York



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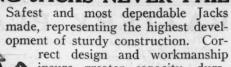
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insure greater capacity, durability, safety and more perfect ease of operation than any other Jacks of equal size.

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Sold by leading jobbers and dealers. Ask for catalogue of 14 sizes

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81 Tenth Street Long Island City, New York A SIZE FOR EVERY CAR

## A Car Which Sells On Its Merits

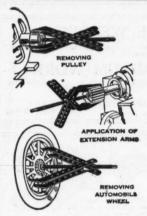


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The French designed motor secures a flexibility rarely equalled, which means economy, ease of control, dependable starting-a motor that is as nearly trouble-proof as engineering genius can make it.

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Pulls any gear, wheel or pulley anywhere in a jiffy. Built on the only correct principle. Produces maximum efficiency with minimum effort. Can't twist off or let go. THE HARDER THE PULL—THE TIGHTER THE GRIP. Reduces operating cost and increases the earning capacity of any Repair Shop. Made from best grade drop forge steel. Almost unbreakable. Adjustable up to 13 inches diameter. Satisfaction guaranteed or money refunded. Order or write for details today. Price complete with extension arms, \$11.00.

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Individualized Body Equipment for Every Business

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When you see this splendid new-style Winton Six your eyes will twinkle with pleasure, and when you ride in it—then you will admit that there is something new under the sun, something finer and more delightful, something to make life ever so much more worth living.

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DEALERS—Puttees are in great demand among motorists. In the Colt Cromwell line you will find the widest range in styles and prices.

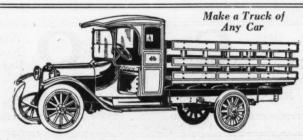
All our products are made of the finest materials procurable. Style, fit and finish measure up to the highest standard.

In your territory there are many motorists and others who are highly possible customers. You can therefore make this a rapidly selling profitable line in your business.

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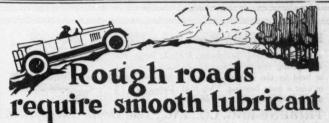




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WRITE for our fully illustrated and descriptive literature on how YOU CAN MAKE A TRUCK OF ANY CAR, and how you can make money doing it. Complete units furnished for easy assembly—Internal gear or Worm drive, 1 to 5 ton trucks. Get details now.

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SERVICE STATION—ELECTRICAL REPAIRS GENUINE PARTS

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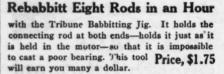
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FORCES THE OIL in and around the shackle bolts or wherever required. "FORC" OIL CUPS can be operated at the rate of 3 per minute and ELIMINATES the disagreeable task of filling and turning down grease cups. See your dealers or write us for interesting literature.

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EXPERTS IN ALUMINUM WORK We manufacture the famous TORIT welding and lead burming outsits ideal garage equipment. Write for catalog.

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Makes perfect joints; cuts easily:
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#### QUALITY TOOLS FOR

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Burning-In Machines, Axle Stands, Motor Stands, Clamps, Vises, Arbors and Straightening Presses, etc. DEARBORN EQUIPMENT CO. KALAMAZOO, MICH.



Quick

**Economical** 

LAMBERT LICENSE PLATE HOLDER

Slip holder through plate, then through bracket, give quarter turn and your plate is on to stay. No Noise. No Rattle. Retail Price, \$1.00 per set of four. Write for discounts LAMBERT MFG. CO.

Safe

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Will Not Burn

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TRADE MARK METAL POLISH Removes Tarnish, Rust and Verdigris from ALL Metals. Manufactured by

CLEROLINE CHEMICAL CO., 507 Fifth Ave., New York City Half pint sent propaid on receipt of 33 cents.



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MOTOR AGE

June 24, 1920

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"Saves Your Battery" MIRROR PARK LITE CORPORATION
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NEW YORK 208 West 17th Street

VULCAN PRECISION CYLINDER GRINDER

Grinding wheel supported at both sides. The modern grinder, on the new and better principle. Price \$325. Write. VULCAN APPLIANCE CO.

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INSYDE TYRES —genuine inner armor for auto tires. Double mileage; prevent punctures and blowouts. Easily applied between casing and tube without tools, in any tire old or new. Distributors and agents wanted. Previous selling experience unnecessary. \$25.00 profit per day easy. De Big Profits. Sales Guaranteed. Good Service. Details free. Dept. 237 rican Accessories Company



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Full information and descriptive literature on request. Exclusive Manufacturers

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Invest a 2-cent stamp to investigate the unusual sales proposition on

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500 to 2000 lbs. lighter than any other worm-drive truck of equal capacity. World standard working units. The Dearborn is years ahead in economy. Find out.

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Acclaimed by the trade and public everywhere as the dominant car in its field.

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KINGSTON CARBURETORS



List, \$1.00 For 1/2-in. Spindle Body Bushing Quick Work-No Damage

J. & B. Bushing Remover

Made of high-grade nickel steel. Built in a way that insures service.
Easily inserted in spindle without removing wheel. J & B MANUFACTURING CO., Pittsfield, Mass.

FOR YOUR PARTICULAR CUSTOMER! The Windshield that stays put at any angle. Are you selling it? Not cheap, but mighty profitable. Send for descriptive booklet.

PERKINS' TONNEAU WINDSHIELD CO., Incorporated

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See Page 5



Make Customers Glad

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# Repair Tools

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holds your spare tire securely, is strong and rigid, cannot rattle or become loose, prevents your tire from chafing, may be locked, and is guaranteed against breakage.

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Eleven handy tools in one compact unit.

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are used on the best and highest priced trucks and tractors. They are guaranteed for the life of the motor.

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Headlight Deflector
Cuts off all dangerous glare without waste of
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clare deflector. Simple and unbreakable.
Ford size \$3.00
Ford size \$3.00
Add 25 cents West of Rockles

BRADSTO APPAJANCES, Inc.,

65 Main Street. Buffalo, N. Y., U. S. A.





Manufactured by Koko Mat Mfg. Co., 110 E. 23rd St., N. Y. City Sales Dept., Mooers-Wright Co., 1400 Broadway, New York



Learn Automotives in the Center of the Automotive World

es Trucks Tractors

Thorough, practical training; splendid equipment; factory co-operation; competent instructors; satisfied graduates; could any school offer more? Start any day. Get complete information about our school and courses. Write us now; new rates in effect August 1, 1920. Make your reservation now; come later at present rates.

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Mends any tire or tube without the use of heat, tools or patches.

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THE SUPERFIX RUBBER COMPANY Elvria

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Universal removes all water, dirt and insoluble matter from gasoline, preventing carburetor troubles and frozen gasoline pipe, is automatic in action, cannot clog, and is easily cleaned. Unlike ordinary strainers and filters. Retail price \$10.00.

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# Starter Steel Ring Gears

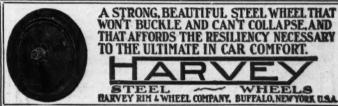
For Fly Wheels of All Cars We make the Easiest Entering gears on the market. POSITIVELY NO BINDING.

Kent Auto Parts Co. Denver, Colo.



Every Length Guaranteed for 1 Year's Service Metal Hose & Tubing Company

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June 24, 1920

MOTOR AGE

187

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Use a light, yet strong, well balanced, portable electric tool with ample power and a combined oscillating and rotating movement. The Eclipse Valve Grinder has all these features.

Write for details. Also see current issues of Motor Age.

ECLIPSE VALVE GRINDER CO. Kansas City, Mo. Gateway Station,



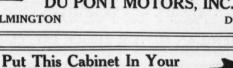
duPont automobiles are designed and built for the motorist who demands more than mechanical excellence.

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DELAWARE

DUPONT



It is a Spark Plug and Electric Bulb, Fuse and Brush Cabinet combined. Everything is at your finger tips. No breakage—no loss. It is a business getter and a time saver. Write for catalogue.

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#### WALKER BADGER GUARANTEED AUTOMOBILE JACKS -insure easy-speedy operation under any condition. Catalog on

Keep abreast of the times"

request. Lists entire Walker Badger Line—both Pleasure Car and Truck Jacks—"A Jack for every job." WALKER MFG. COMPANY. 25 Hamilton St., Racine, Wis.

MAKES IT EASY



to open and close split rims of all types. Will cause the most stubborn rim to yield.

PRICE \$4.00 The K. P. Products Co., Inc. 250 West 54th St., New York City

ARBALLO Carbon, Graphite and Metal Graphite BRUSHES for use on all types of starting motor and lighting generator equipment. A stock of C. P. Brushes save time and insure satisfaction. Prompt shipments assured. Code catalog, listing all cars, upon request. S н E



THE CARBALLOY PRODUCTS CO., Bellevue, Ohio

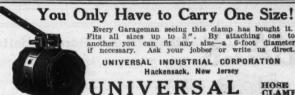


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For Automobiles, Tractors, Trucks and All Automotive Equipment

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Every Garageman seeing this clamp has bought it. Fits all sizes up to 3". By attaching one to another you can fit any size—a 6-foot diameter if necessary. Ask your jobber or write us direct.



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Specialize on materials and good workmanship—most vital to battery construction. Thoroughly tested and covered by a 2-year guarantee on which basis all authorized representatives are instructed to make adjustments. Write. MINNESOTA STORAGE BATTERY CO., Minneapolis, Minn.

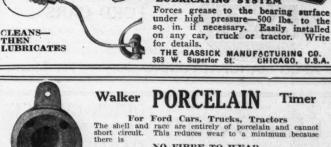
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Kester wire Solder

—has the flux right in it. No separate flux—pot of acid or paste is needed. Saves time and labor—does better and cleaner work. It saves money in any garage or repair shop. Get it from your dealer or write us. CHICAGO SOLDER CO. 218 N. Union Ave., Chicago.

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To the Trade: This Ford Ignition Accessory sells fast and stays sold. Our proposition is attractive—write for it.

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Accelerator Pad. Rests the foot while in correct position on accelerator. Maintains even pressure on roughest roads. Saves gas, danger. List, \$1.50 each. with each dealer dozen. Write for discounts.

discounts.
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MACK STORAGE BATTERY CO., Detroit, Much.



Installed in front of your garage, the Bowser Curb Pump suggests a new supply of clean, filtered, full-powered gasoline—SERVICE.

Install one of these pumps now and secure your share of this Profitable Business.

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# NAPOLEON TRUCKS

Conqueror of the Highways

Built with nationally advertised parts, known to 90% of the buying public.

NAPOLEAN MOTORS COMPANY Traverse City, Mich.



# **EQUIPMENT FOR** FORD CARS

Our 1920 catalog is now ready for you. Twenty-five items, all good sellers and big profit getters.

APCO MANUFACTURING CO.

Providence

# SLIPOVERS QUICK CHANGE AUTO WORK

# GARMENT

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Columbus, Ohio



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SPEED—POWER—ECONOMY Dealers-This Valve in Head

Sells on Sight Write for Details

WANTED — Dealers and distributors for every city, county, and state.

TRINDL SALES CORP.

Manufactured by Rajo Motor Co., Racine, Wis.

2917-21 S. Wabash Ave., Chicago



Fire Regulations. Large profits are allowed Dealers and Jobbers. Write for complete information.

It is well made, and absolutely thief-proof. Cars cannot be towed or driven when locked with the Lucia "Auto Lok." It complies with City

LUCIA MANUFACTURING COMPANY, Incorporated.

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BRINGS A NEW CONCEPTION OF MOTOR TRUCK VALUE

In design, construction, performance and price, the new All American Motor Truck represents a value that is new to the one-ton field. An opportunity is offered a limited number of dealers to secure an exceptional franchise. Write for details.

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Automatic-Accurate-Substantial

Handles any gas engine from a motorcycle to a tractor.
Write for information.

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1299 S. Third St.

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Executive Offices: 6 East 39th St., New York City
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"ANYTHING AND EVERYTHING FOR AN AUTO"

# TIMES SQUARE AUTO SUPPLY CO.

"World's Largest Auto Supply House"

Executive Offices, Broadway at 56th St., New York City

We operate 34 Distributing Branches in 30 leading cities. Send for our complete catalog and dealers' proposition.



**ABC Running Board Mats** ABC Safety Grips for Trucks

A Profit-Proposition for Jobber and Dealer

American Business Corporation Automotive Division

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New York



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Gives steady acceleration. Saves gas, and saves bearings. Holds the foot firmly in a comfortable position. Avoids cramped and aching muscles. Write for dealer proposition.

WILLIAMS SOFT PEDAL CO. Cedar Rapids, Iowa



# Pittsburgh Visible Gasoline Dispenser

Their unequalled simplicity assures absolutely dependable and economical operation. Write for information.

Model 1, \$195 Model 2, \$285 THE NICHOLSON CO., INC.

Fancourt and Duquesne Way

Pittsburgh, Pa.



# SAY "W. & C."

and Your Jobber Will Give You the Most Successful Time-Tried Shock Absorber for Fords W. & C. Shock Absorbers Sell

P. H. WEBBER COMPANY Hoopeston,



WALLACE TIRE TOOLS
For Putting On and Taking Off
Cilncher Tires

Tremendous leverage and positive action make these tools unusually easy to operate. No matter how stubborn the tire is these tools will take it off or put it on.

Write for attractive dealer proposition

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Eu. te 416, Reaper Block

New York City

105 N. Clark St. Chicago



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For Removing Auto Wheel, Gears, etc.

New Locking Arm holds Puller on your work Send for Bulletin D, Puller Arbor Press, etc.

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Automotive Dept.

Springfield, Ohio

UTILITY SUITS "AUTOMOTIVE" Brand



# SERVICE STATIONS WANTED

The Electrolyte Storage Battery, through the absence of separators, eliminates 95% of all storage battery troubles—yet it costs no more than an ordinary battery. It is specifically guaranteed for 18 mon.

or repla either for repairs or replacement, without charge.

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BY THE BALE AND SAVE MONEY
These new, clean cloths are put up in bales for your convenience. Let your workman use them for all wiping and polishing jobs. Also in place of towels. They will save you money Mireco Cloths are carefully selected Cheese Cloth, Flannel, Towelings, Blanket Ends, etc., from the largest cloth mills, cut in convenient lengths and packed in bales ready for use. Write for samples and price to choose from.

MILL REMNANTS CO.

19 Bond Street

New York City



Broadway and 58th Street

### "THE PUMP THAT PUMPS"

The PRIME-OR-KLEAN SPARK PLUG

Is the all-purpose plug. When the motor won't turn over, prime with Prime-Or-Klean. When the carbon gets bad, a quick turn of the plug terminal converts Prime-Or-Klean into a carbon remover. At all other times, Prime-Or-Klean is a fine hot-spark mica-core plug. If you want to capitalize on your spark plug sales, write for Prime-Or-Klean data. THE LIBERTY AUTO IGNITION COMPANY, Inc.

A Vacuum Release Valve located at the bottom of the plunger is one of the many distinctive advantages of the Myers Auto Pump. Write for booklet containing complete information and dealers' discounts.

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ERS AUTO



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The Perfection Tire Rack holds more tires and takes up less room than any rack you have ever used. Besides displaying each tire to good advantage, an automatic locking device locks the tires in place and protects you against tire thieves.

Rack is shipped "knocked-down" and easily assembled.

Write for sizes and prices.

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The DUNN "EVERY MOTOR" CYLINDER REBORER

Costs about half as much as others—can be adjusted to rebore 95% of all cylinders—from smallest to largest. Bit adjustable to 1/1000 of an inch. Easily attached. Can also be operated by drill press, Makes a clean, quick job. A big money maker wherever installed. Write for details.

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4 Cyl. 3x41/2 6 Cyl. 3x41/2 4 Cyl. 25/8 x 4 OTHER SIZES UNDER WAY

We also issue licenses covering our patents to complete vehicle manufacturers CAMERON MOTORS CORP., 2 Columbus Circle, New York



Water-Mixed Grinding Compound

Seats valves in half the time ordinarily required. Eliminates the tell-tale rings that prove imperfect work. Saves the cost and waste of a second grade. See Automobile Trade Directory for list of jobbers.

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DURABILITY

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Exclusively for Fords

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SURE





# THE SPOOK SKID CHAIN MACHINE

A garage repair shop and service station necessity. Removes worn cross link by a simple foot pressure, and securely fastens the new members by another foot pressure.

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**EVERYONE** WANTS IT

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Standard Make—one of the big Five Companies.
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Instantly Loosens All Rusty Nuts, Bolts, Rims or Connections

Stops squeaks in springs.
Prevents carbon.
Primes motors.
Saves ten times its cost in time, report and material.
The Genuine, Original Rust-loosener.
For sale by leading dealers. Send for terms.
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The Auto Mechanics' Transmission Wrench for Fords



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Corrects Ford Ignition Troubles
The Thomas Timer Elevator corrects Ford Ignition
Troubles—is comparable to the best ignition systems
on the highest priced cars—and can be attached in
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Factory, Waukegan, Ill.



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Write for Literature and Dealers' Proposition.

MOR-AIR AUTO PUMP CO.





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Light

Powerful Economical CHASSIS, \$6,750 Closed bodies by Brewster & Co.

Open Territory

Write for Particulars MORTON W. SMITH CO.

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A handy indestructible oiler made in handy sizes for every car owner in your territory. Its flexible spout makes oiling easy—you can oil around the corners with it.

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The tool that makes it easy for the garage and repair man to insert piston rings of various sizes successfully and easily.

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Write your jobber for this device or send us his name and buy direct.

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Immediate deliveries on

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The Story of Romine Will Appear in These Columns Soon—Watch for it



The battery wih the 40% larger plate surface. Good territory open for reliable distributors.



FOR ALL CARS

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For Perfect Piston Performance Use

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Absolutely Guaranteed to-Increase the Horsepower Reduce Gas Consumption. Enable You to Climb Hills More Easily.

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Hable You to Climb Hills More Easily.

For further information write

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MAKE GOOD—OR WE DO
Dealers Sell Them On That Basis
Hill 3-A Spark Plugs cannot short circuit, leak
compression, foul, or break. The design specifically provides against these evils, DEALERS—
They will GO ON and STAY on the meanest motor that ever pumped off. Order a set and prove
it. Price \$1.25. Liberal discounts.

HILL INSULATING & MFG. CORP..
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CORP..



# ALUMINITE PISTONS AND CONNECTING RODS



put 6-cylinder smoothness into 4-cylinder motors; give any motor more power, more speed, quicker getaway and more miles per gallon with less bearing trouble.

Send for Circular.

CYLINDER GRINDING by the famous Green method. Manufacturers of Pistons, Piston Rings, Piston Pins, for all makes of motors—standard, oversize or special.

GREEN ENGINEERING CO. Dayton, Ohio

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National Wheels are Resilient, Efficient, Durable and Economical. They have rubber in the wheel, not on the tread, Write us today for complete information and interesting literature. 1½ to 10 ton capacity.

# NATIONAL WHEEL

THE PITTSBURGH TRUCK WHEEL CORP.
Pittsburgh

# THE SQUEAKS HY-KON WEDGE PLATES



Reinforce wedging power of wedge type lugs. Make old lugs good as new—keep new lugs new—stop squeaks and increase rim and wheel life in a big way. Quick and easy sellers. Write for information.

ALLIANCE SUPPLY MFG. CO. ALLIANCE

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With patented reverse taper construction and hub-cap wedges, wheel positively cannot come off by accident. Safety, beauty and comfort. Saves tires. Quick, easy changes. Set 5 wheels, \$75. Order through Ford dealer. Write for further information or dealer's proposition.

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The Stewart Hub Makes Safety Sure

# Chicago.

One-Piece Piston Rings The Gill Manufacturing Co.



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"Keeps the Cops Away"

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Gives Fords the appearance of higher priced cars. Fits 1917, 1918, 1919 Fords. Retails \$6.50. Dealers—Write for profitable proposition.

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Eliminate Blowouts, prevent Punctures and double mileage. Easily adjusted without the use of tools. Automatically becomes part of tire.

Better and cheaper than retreading. Big Money Maker. Free details, write today.

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SERVICE SYSTEM VISIBLE GASOLINE

The most reliable filling station made. Will make big profits for you.

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12,000 Miles Guaranteed

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This Dial Board, size \$x18", made of real wood veneer with a one-inch mahogany finish frame, is given to any Car Distributor, Dealer or Garageman who orders ten or more assorted Boyce Moto Meters, one delivery. We also send two additional Big Sales Helps, the Counter Display Stand and our new Service Sign. For full information write your jobber today.

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The most powerful hauling machine in the world. Makes all roads good roads. Capacity four times its own weight. Standard specifications. Catalog.

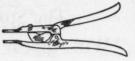
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# T & L Valve Lifters for Speed

Speed and quality of work are the two factors that count most in taking out valves. T. &. L. Valve Lifters are speedy and do good work. Operate by simple cam action; no springs to get out of or ier.

Price 75c. Write for full particulars.

THE ONLY GREASE GUN CO. Jefferson, Iowa.





Coil Springs for Every Requirement

Extension—Compression—Torsion—Wire Spring Special Wire Forms

Acquaint us with your problems, thereby making use of our many years of experience.

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are made with one object in view-quality. Sold on one principle-entire satisfaction.

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· Minneapolis, Minn.



IN BIG DEMAND Every Ford dealer and service station should carry this enormously popular accessory. A Liberty silver sirell with permanently beautiful finish.

Fits standard Ford core, giving the appearance of a beautiful Rolls-Royce type radiator. Price \$12.00.

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LIBERTY SHELL for Ford Radiator

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Four cylinder Automobile Motor is now being built and sold by

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A Growing, Profitable Business

Easy to learn; instruction book \$1. Three weeks' practical school course free. Plants \$50 and up. Our catalogue free. We save you 25% to 40% on up-to-date plant.

AUTO TIRE EQUIPMENT CO. 157 Canal St. Cincinnati. Ohio



SEARING GREASE TO BE FILLED WITH

Searing Grease Cartridges

THE LEWIS SEARING COMPANY

## SCHACHT TRUCKS WITH TEN SPEED TRANSMISSION



Offer new marvels of power and speed. The year's best dealer proposition. Write

The G. A. Schacht Motor Truck Co. CINCINNATI, OHIO



The quick, clean way to "grease" any car. Manufactured by

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Ford Accessories That Make the Car Better

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GASOLINE EASY CONTROL

Retail Price, \$2.00
PORTER PRODUCTS CORPORATION s to George G. Porter, Specialty Engineering and Manufacturing Offices: Keith Theatre Bldg., Syracuse, N. Y.



The COMPLETE TRUCK

Full Line of Sizes Completely Equipped No Extras to Buy Except Body NELSON MOTOR TRUCK COMPANY, Saginaw, Mich.



The name that means OUALITY when buying replacements

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GOODELL 500 GOOD TOOLS

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Equip your garage for the most profitable work. A Storm Tool for every job. Write for catalog.

Replace Grease Cups

Oil Kipps

MADISON-KIPP CORPORATION WISCONSIN



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Rebound-Shock Absorber

Relieves leaf spring action; checks rebound; prevents side sway; avoids spring breakage; more than doubles Ford spring length.

Write for absorbing leastet written by "Jess from Co. 10."

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# TRUXO AUTOMOBILE SOAP

Fine soaps of every description for motor cars. Ask your jobber or write direct. More information on request.

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With Military Type Wisconsin Motor

DEALERS!

GFT PARKER TRUCK
SPECIFICATIONS
and particulars of
PARKER DEALER
PROPOSITION—then see
what's the best truck to
sell. Write now.
PARKER
MOTOR TRUCK CO.
Milwaukee, U. S. A.

# OSHKOSH

4-Wheel Drive Truck Two Ton Capacity

OSHKOSH MOTOR TRUCK MFG. CO.



Carries Two Tires

Makes Them Burglar-proof

THE TWINLOCK COMPANY

1525 Cambridge St., Philadelphia, Pa.

Works Both Automatically and By Hand

BOYCE-VEEDER CORPORATION
Long Island City N. Y., U. S. A,



There's no chance of this long-armed tool slipping—it grips the work like a vise, adjusting instantly—locking tight. Greb Arbor Press Base and Bench Plate attachment for Senior Puller gives you \$110 equipment for less than one-third tha amount. Dealers and Jobbers—Write for our liberal discounts and 10 days' trial proposition. THE GREB CO., 305 State Street, Boston, Mass.



Offers an almost unlimited opportunity for dealers Write for catalog and dealer propositio The Cleveland Tractor Co., Cleveland, O., U. S. A.

Resilient, non-skid, non-heating DEALERS: Get our proposition

Cellular TRUCK TIRES

THE SWINEHART TIRE & RUBBER CO., Dep. E., Akron, O.



GOODBY PUNCTURES

When you start on a motor trip you'll got there without tire trouble if you use compression tubes manufactured by the U. S. Compression Inner Tube Company, of Tulsa, Okla. Forget puncture worry. Tube inflated with air and not filled with a fluid or other substance. Prolongs the life of a casing.

COMPRESSION TUBE AND TIRE CORPORATION

ories: Jersey City, N. J.; Tulsa, Okla. Sales Office, Eastern Territory: 318 W 39th Street, New York. Territory West of Mississippi River: Tulsa, Okla.





The Mengo Stictite Patch is an all rubber gasoline patch that contains the fastest cure gum on the market. It resists Heat. Sold with a money back guarantee. It insures quick turnovers and large profits for the dealer. Write for our proposition.

537 Rosedale Street,

MENGO PRODUCTS COMPANY
(3) Pittsburgh, Pa.



"The \$2 Spark Plug with the Ball" FOUL-LESS SPARK PLUG CO. 200 East Third St., Davenport, Ia.



your car from jolt
The finest foreign
THE HOUDE COMPANY
Buffale, N. Y. and jar. 35 Root Building

ited kinds and capacities.

The Usaco Line comprises 20 different numbers in two stage and single stage types, and various in-dividual equipment adapted for forming combinations of almost unlim-

Our catalog giving complete information will be sent free upon request.

The U. S. Air Compressor Co. 6534 Carnegie Ave., Cleveland, Ohio



# THE CLEARING HOUSE

OF THE MOTOR INDUSTRY

FOR PARTS, ACCESSORIES, TIRES, MACHINERY REBUILDING, REPAIRING, WELDING AND USED CARS. ALSO HELP AND SITUATIONS WANTED AND MISCELLANEOUS CLASSIFIED ADVERTISING

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We specialize in the MANUFACTURE of automobile transmission and rear axle gears and shafts. Our entire organization is devoted to the manufacture and distribution of this one line only. Our plant equipment includes the most modern types of gear cutting machinery for both spiral and straight tooth types of gears.

Our transmission, rear axle drive pinions, spiral drive gears and a large percentage of our straight tooth drive gears are made of NICKEL STEEL and are all scientifically heat treated and hardened in furnaces designed for that work and by men WHO KNOW HOW.

Following is a list of cars and trucks for which we manufacture and supply transmission or rear axle gears and shafts:

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Allen	Commonwealth	G.M.C.	Kline	New Era	Saxon
American	Climber	Geronomo			Scripps-Booth
American Beauty	Comet	Glide	Lenox	Oakland	Selden
Anderson	Crow-Elkhart	Grant	Lexington	Oldsmobile	Seneca
Apperson	Cutting		Liberty	Olympian	Signal
Atlas		H-A-L	Little	Overland	Skelton
Atterbury	Daniels	Hackett	Lone Star	O TOTALING	Stanwood
Auburn	Davis	Harroun	A STATE OF THE STA	Paige	Stewart
	Detroiter	Hanson	McFarlan	Palmer-Singer	Studebaker
Beggs	Dixie-Flyer	Hatfield	Madison	Partin-Palmer	Stutz
Bell	Dorris	Haynes	Marshall	Pathfinder	Sphinx
Bessemer	Dort	Henderson	Maibohm	Paterson	Standard
Birch	Drexel	Holmes	Marion	Peerless	Sun
Bour-Davis	Drummond	Hudson	Marion-Handley	Piedmont	
Briscoe	121	Huffman	Menominee	Pilot	m 1
Buick	Elcar	Hupmobile	Maxwell	Pullman	Templar
Cadillac	Elgin		Metz	Princess	Tulsa
Carnation	Emerson	Interstate	Mitchell	Premier	Velie
	Empire		Moon	T T CHITCE	Victor
Case	Economy	Jackson	Moore	R. & V. Knight	Vim *
Chalmers Chevrolet	Everett	Jordon	Moline	R.C.H.	
	F-A-L	Jones	Monarch	Regal	Warren
Champion	Essex		Monitor	Republic	Westcott
Chandler	Federal	Kelly	Monroe	Roamer	Wichita
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Our New Catalog Ready for Distribution June First. Yours for the Asking.

Dealers and Repairmen: Order your replacement gears and shafts direct from our factory or from our nearest exclusive distributor, and receive

LIBERAL DISCOUNTS AND PROMPT SHIPMENTS

# **AUTOMOTIVE GEAR WORKS**

291-97 Marietta St. FORMERLY AUTO GEAR & PARTS CO. ATLANTA, GEORGIA.

MANUFACTURERS OF DOUBLE DIAMOND GEARS AND SHAFTS

Look for the "Double Diamond" Trade Mark

EXCLUSIVE DISTRIBUTORS

Auto Gear Co., Inc., 844 Eighth Ave., New York, N. Y. Auto Gear Co. of Chicago, 1461 S. Michigan Ave., Chicago, Ill. Auto Gear Co. of Los Angeles, 1213 S. Hope St., Los Angeles, Cal.

Auto Gear Co. of Boston, 1151 Commonwealth Ave. Boston, Mass.

IF IT CAN BE HAD WARSHAWSKY HAS IT, OR WILL GET IT FOR YOU Wire, Write or Come In

If Necessary, Send Us Your Old Parts-We Can Duplicate Them

Every Used Part Is In First Class Condition, and Will Render Satisfactory Service. If We Cannot Satisfy You, Your Money Will Be Cheerfully Refunded

### SPECIAL MOTOR **BARGAINS**

All in Excellent Condition
UNIT POWER PLANTS
Wisconsin Out of Cutting A and \$100.00

Wisconsin Out of Cutting 4 cyl.	
Menominee 4 cyl	100.0
Rutenber 4 cyl	100.0
Master 6 Chalmers 6 cyl	
Knox 6 cyl	175.0
Haynes 6 cyl. with starter and	
generator	175.0
Patterson Northway 4 cyl	
Stoddard Knight 6 cyl	
Hershoff Spillman 6 cyl	175.0
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Model engine 4 cyl	125.0
Haynes 4 cyl	125.0
Continental type C block with	
magneto	175.0
Lozier 4 cyl	100.0

MOTORS-ONLY	
Continental E 4 cyl	100.00
Continental C 4 cyl	100.00
Continental C 4 cyl. with	
starter	100.00
Continental R 4 cyl	100.00
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MOTOR GENERATORS	

MOTOR GENERATORS	
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Jesco	25.00
20 Delco	12.50
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Starter and Generator	60.00
Remy 5, 6, 3, SJ2, 535	25.00
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Ē	33x4		8.90	16.95	2.65
Ē	34x4		9.95	17.55	2.70
Ē	34x41/2		9.25	22.95	3.10
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32x31/2	12.65	2.15
31x4	14.65	2.50
32x4	16.85	2.65
33x4	17.70	2.75
34x4	18.05	2.85
35x4	25.00	3.60
36x4	26,00	3.80
32x41/2	27.00	4.00
33x4½	27.95	4.10
34x4½	24.05	3.50
35x41/2	25.05	3.60
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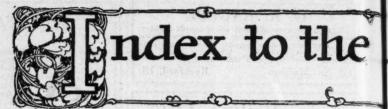
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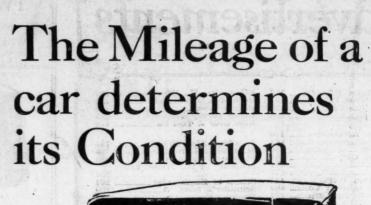
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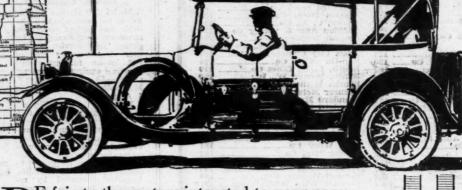
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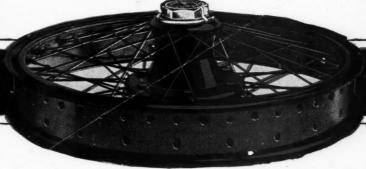
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